US009118616B2

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Lee et al.

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(45) **Date of Patent: *Aug. 25, 2015**

(54) **METHOD AND SYSTEM FOR CONTROLLING SESSION FOR INTERWORKING IN CONVERGED IP MESSAGING SERVICE**

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(73) Assignee: **Samsung Electronics Co., Ltd.** (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/970,014**

(22) Filed: **Aug. 19, 2013**

(65) **Prior Publication Data**

US 2013/0332554 A1 Dec. 12, 2013

Related U.S. Application Data

(63) Continuation of application No. 12/627,856, filed on Nov. 30, 2009, now Pat. No. 8,566,405.

(30) **Foreign Application Priority Data**

Nov. 28, 2008	(KR)	10-2008-0120164
Dec. 1, 2008	(KR)	10-2008-0120688
Feb. 2, 2009	(KR)	10-2009-0008186
Jun. 22, 2009	(KR)	10-2009-0055705

(51) **Int. Cl.**

H04L 12/58	(2006.01)
H04L 29/06	(2006.01)
H04N 21/2381	(2011.01)

(52) **U.S. Cl.**

CPC ***H04L 51/36*** (2013.01); ***H04L 29/06027*** (2013.01); ***H04L 29/06088*** (2013.01); ***H04L 29/06176*** (2013.01); ***H04L 65/1089*** (2013.01); ***H04N 21/2381*** (2013.01)

(58) **Field of Classification Search**

CPC H04L 2012/5618; H04L 29/06176; H04L 29/06088; H04L 29/06027; H04N 21/2381

USPC 709/203

See application file for complete search history.

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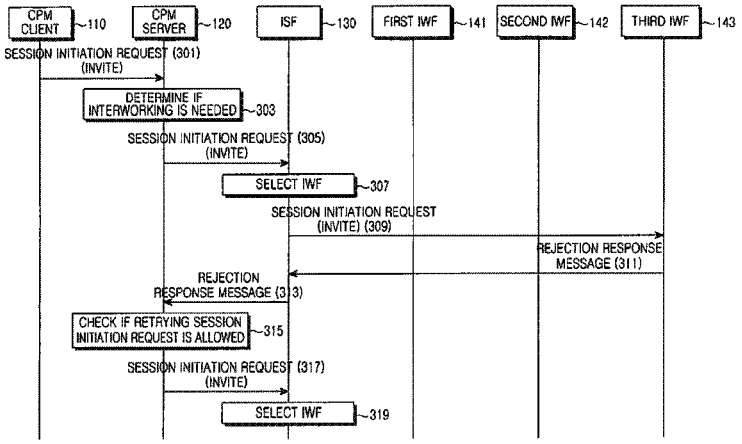
Primary Examiner — Le H Luu

(74) *Attorney, Agent, or Firm* — The Farrell Law Firm, P.C.

(57) **ABSTRACT**

A session control apparatus and method are provided in a converged IP messaging (CPM) server for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. After the CPM session is initiated between the first and second clients through the CPM server and an interworking function (IWF), a session modification request message including specific media is received from the first client. The session modification request message including the specific media is sent to the IWF through the initiated CPM session. A response message is received from the IWF. The response message including a reason for rejection when the specific media is unsupported by the IWF.

12 Claims, 24 Drawing Sheets



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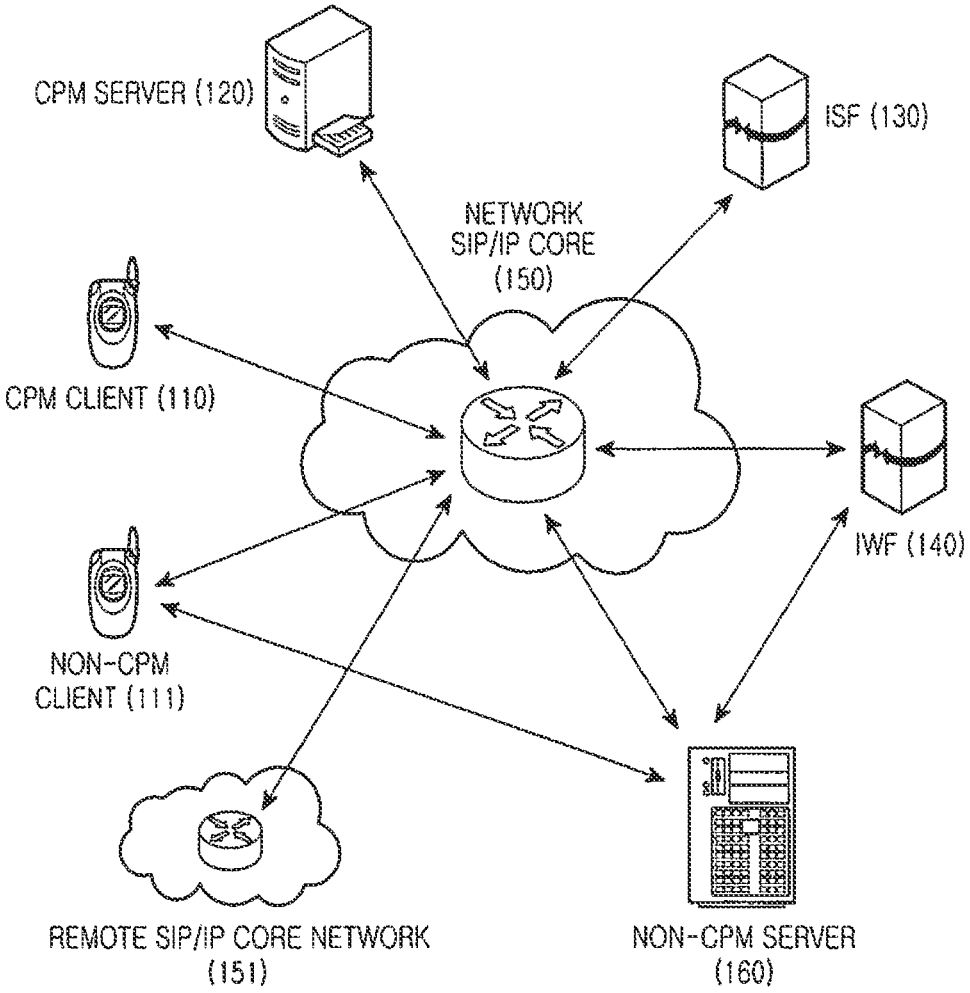

FIG.1
(PRIOR ART)

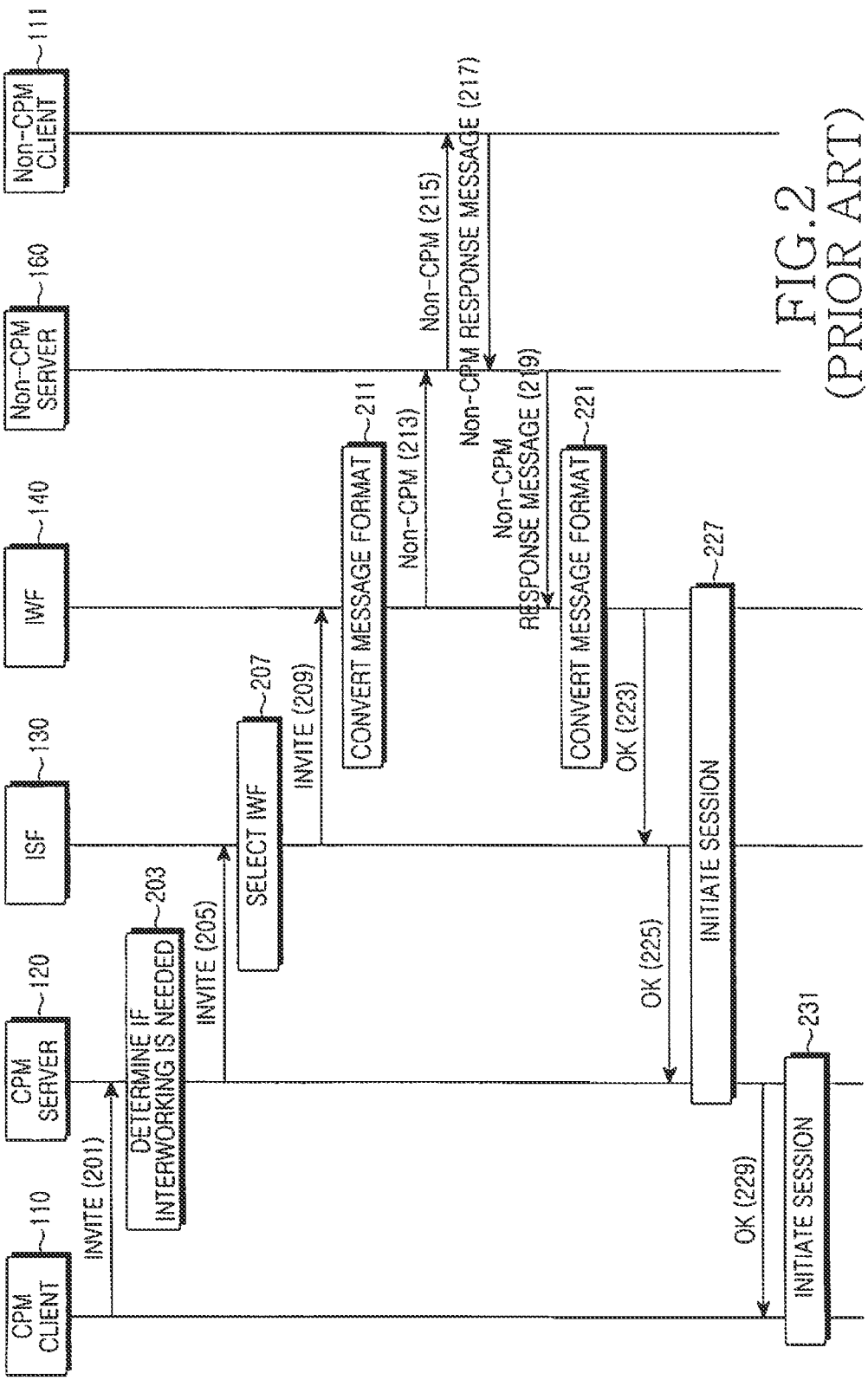

FIG. 2
(PRIOR ART)

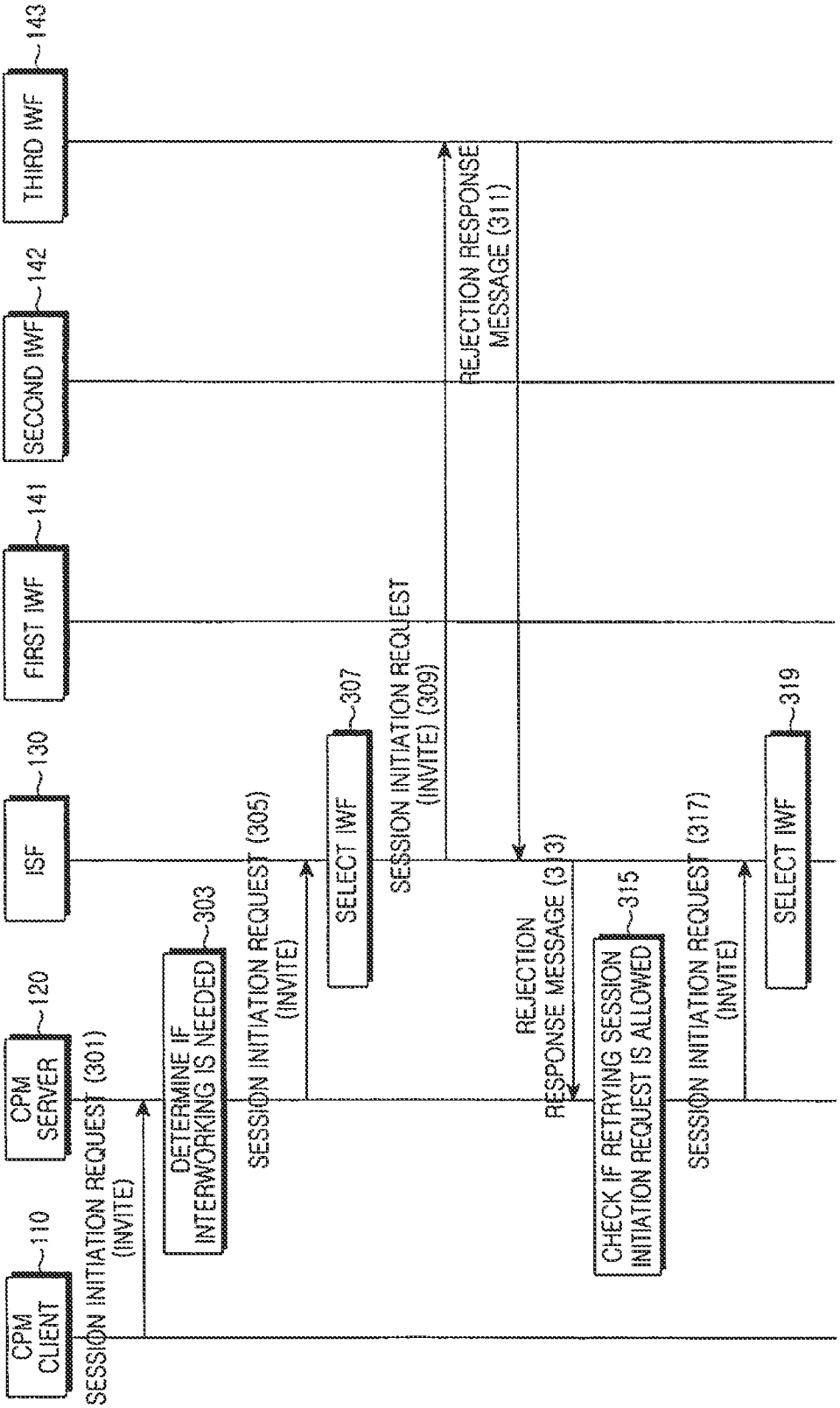
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
SESSION INITIATION REQUEST (INVITE)
(301)
DETERMINE IF INTERWORKING IS NEEDED
303
SESSION INITIATION REQUEST (INVITE)
(305)
SELECT IWF
307
SESSION INITIATION REQUEST (INVITE)
(309)
REJECTION RESPONSE MESSAGE (311)
REJECTION RESPONSE MESSAGE (313)
CHECK IF RETRYING SESSION INITIATION REQUEST IS ALLOWED
315
SESSION INITIATION REQUEST (INVITE)
(317)
SELECT IWF
319

FIG.3A

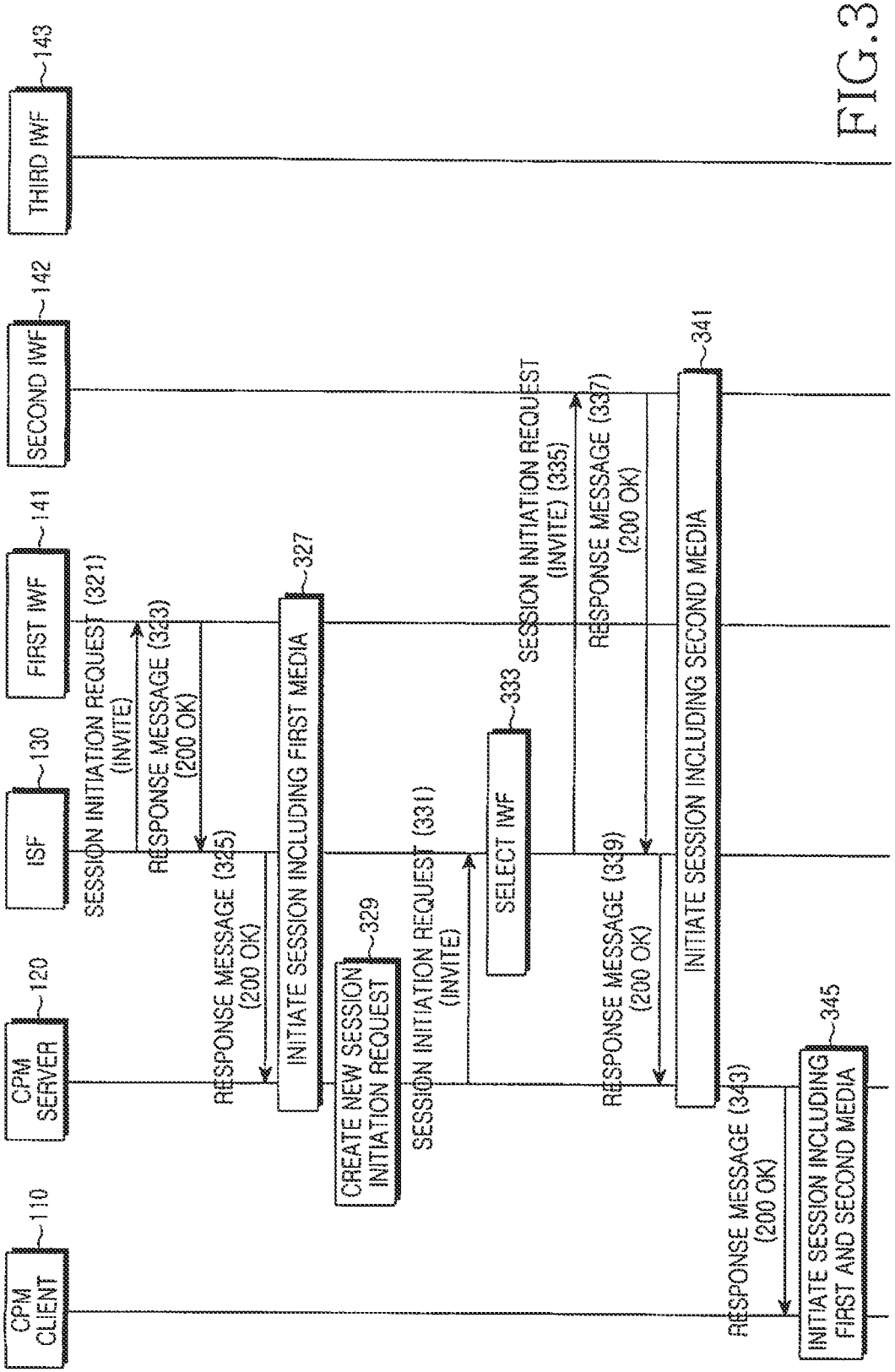
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
SESSION INITIATION REQUEST (INVITE) (321)
RESPONSE MESSAGE (200 OK) (323)
RESPONSE MESSAGE (200 OK) (325)
INITIATE SESSION INCLUDING FIRST MEDIA
327
CREATE NEW SESSION INITIATION REQUEST
329
SESSION INITIATION REQUEST (INVITE) (331)
SELECT IWF
333
SESSION INITIATION REQUEST (INVITE) (335)
RESPONSE MESSAGE (200 OK) (337)
RESPONSE MESSAGE (200 OK) (339)
INITIATE SESSION INCLUDING SECOND MEDIA
341
RESPONSE MESSAGE (200 OK) (343)
INITIATE SESSION INCLUDING FIRST AND SECOND MEDIA
345

FIG.3B

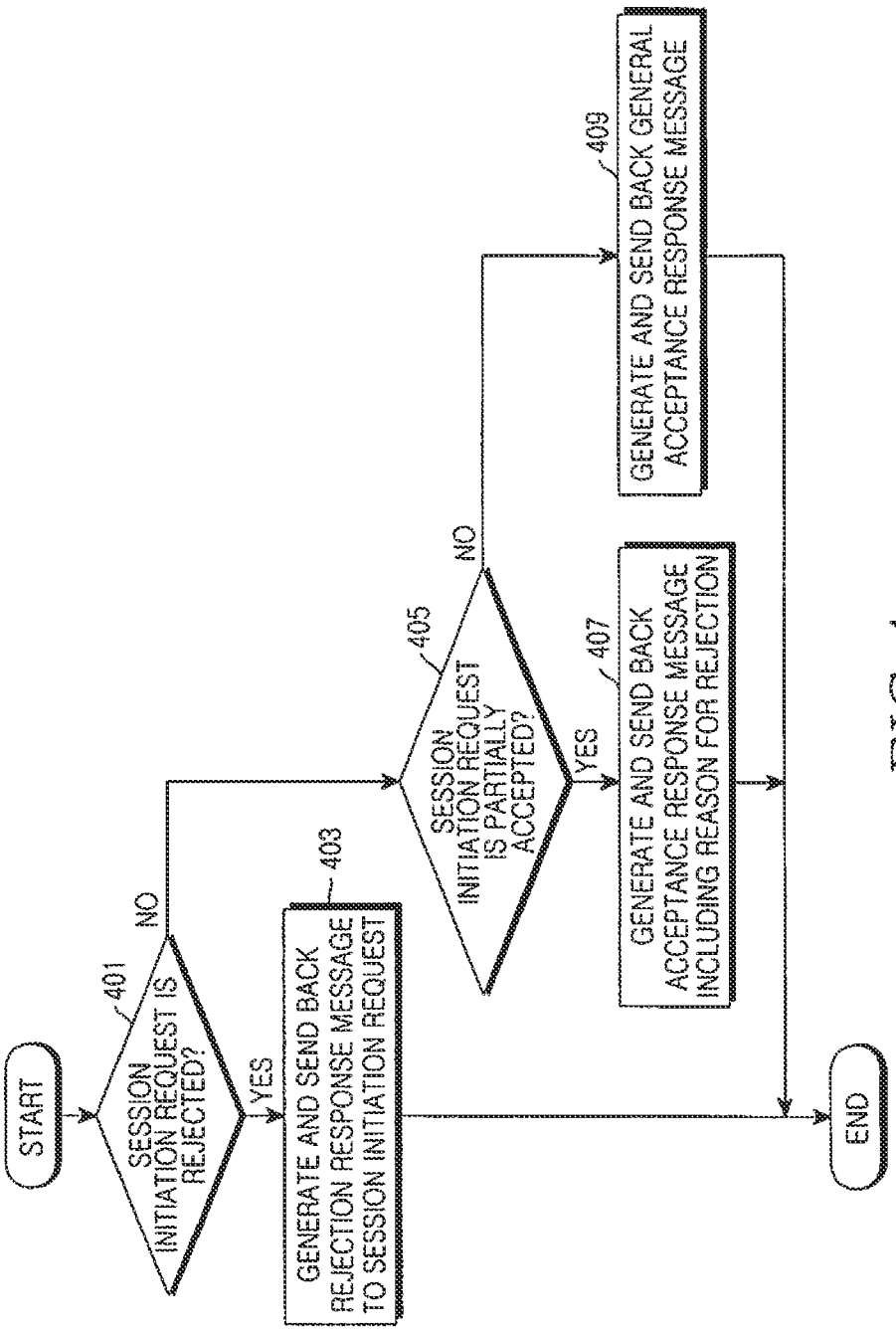
START
SESSION INITIATION REQUEST IS REJECTED?
401
YES
NO
GENERATE AND SEND BACK REJECTION RESPONSE MESSAGE TO SESSION INITIATION REQUEST
403
SESSION INITIATION REQUEST IS PARTIALLY ACCEPTED?
405
YES
NO
GENERATE AND SEND BACK ACCEPTANCE RESPONSE MESSAGE INCLUDING REASON FOR REJECTION
407
GENERATE AND SEND BACK GENERAL ACCEPTANCE RESPONSE MESSAGE
409
END

FIG. 4

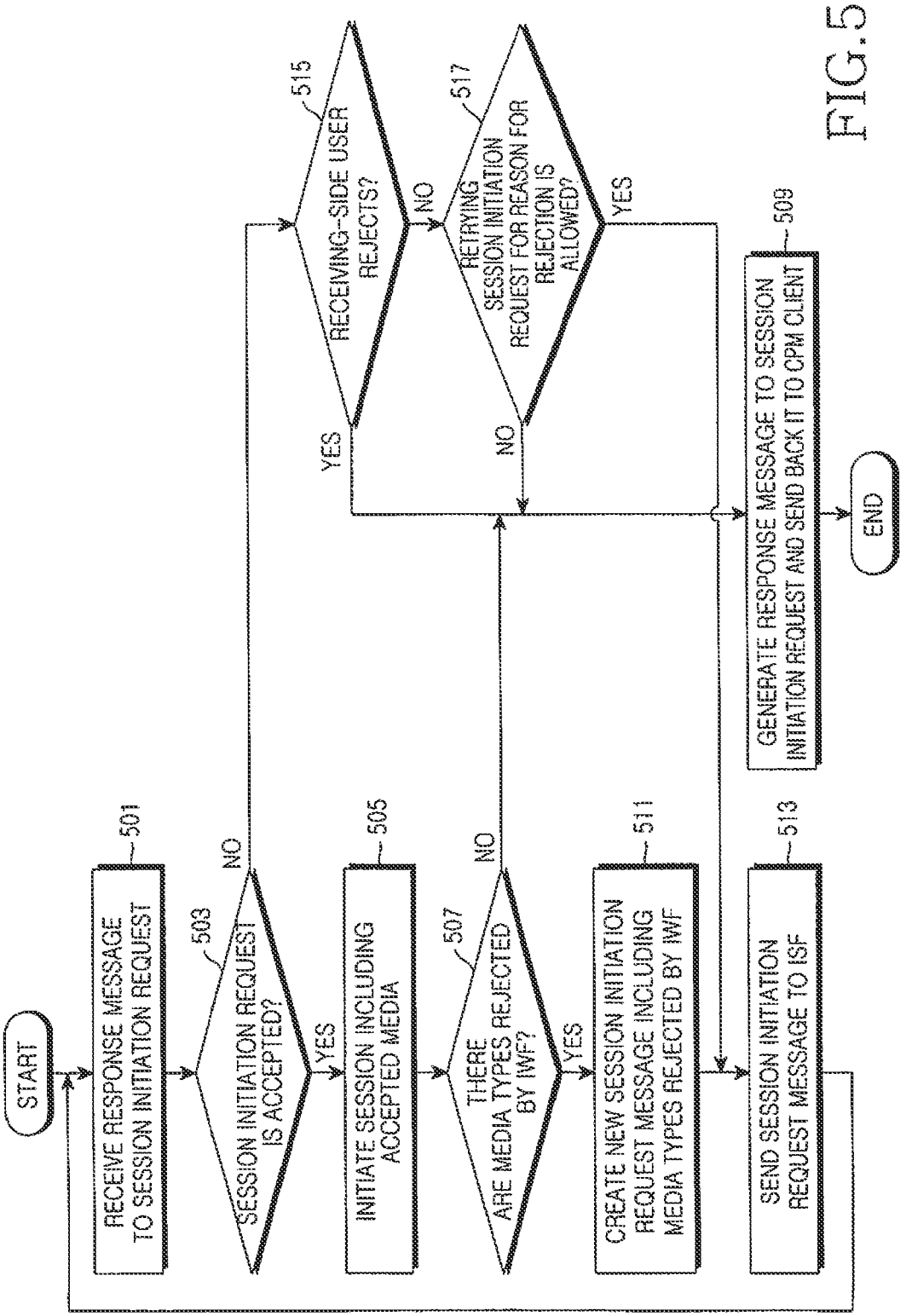
START
RECEIVE RESPONSE MESSAGE TO SESSION INITIATION REQUEST
501
SESSION INITIATION REQUEST IS ACCEPTED?
503
NO
YES
INITIATE SESSION INCLUDING ACCEPTED MEDIA
505
ARE MEDIA TYPES REJECTED BY IWF?
507
NO
YES
CREATE NEW SESSION INITIATION REQUEST MESSAGE INCLUDING MEDIA TYPES REJECTED BY IWF
511
SEND SESSION INITIATION REQUEST MESSAGE TO ISF
513
RECEIVING-SIDE USER REJECTS?
515
YES
NO
RETRYING SESSION INITIATION REQUEST FOR REASON FOR REJECTION IS ALLOWED?
517
NO
YES
GENERATE RESPONSE MESSAGE TO SESSION INITIATION REQUEST AND SEND BACK IT TO OPM CLIENT
509
END

FIG. 5

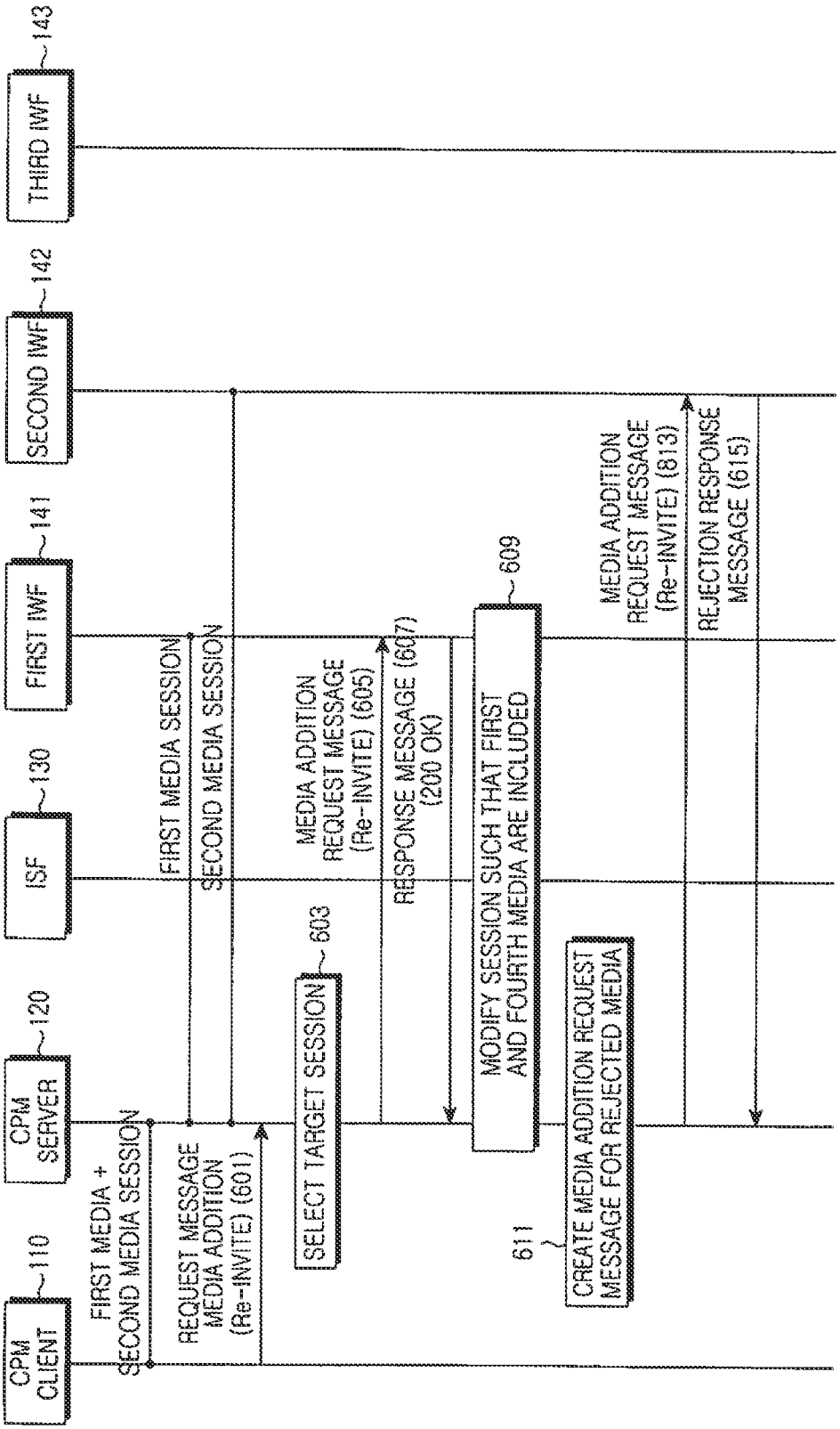
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
FIRST MEDIA + SECOND MEDIA SESSION
REQUEST MESSAGE MEDIA ADDITION (Re-INVITE) (601)
FIRST MEDIA SESSION
SECOND MEDIA SESSION
SELECT TARGET SESSION
603
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (605)
RESPONSE MESSAGE (607) (200 OK)
MODIFY SESSION SUCH THAT FIRST AND FOURTH MEDIA ARE INCLUDED
609
611
CREATE MEDIA ADDITION REQUEST MESSAGE FOR REJECTED MEDIA
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (613)
REJECTION RESPONSE MESSAGE (615)

FIG.6A

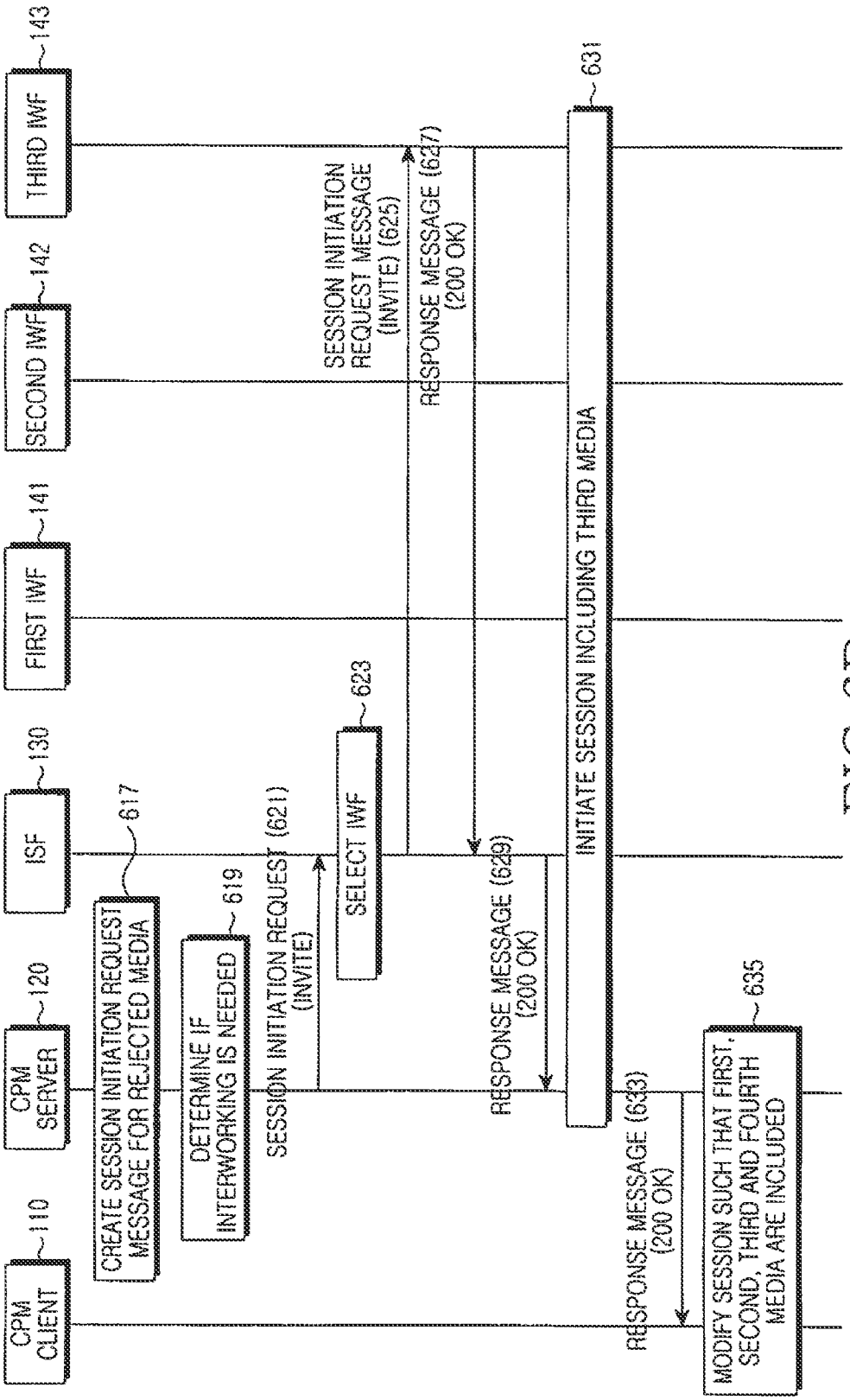
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
CREATE SESSION INITIATION REQUEST MESSAGE FOR REJECTED MEDIA
617
DETERMINE IF INTERWORKING IS NEEDED
619
SESSION INITIATION REQUEST (INVITE) (621)
SELECT IWF
623
SESSION INITIATION REQUEST MESSAGE (INVITE) (625)
RESPONSE MESSAGE (627) (200 OK)
RESPONSE MESSAGE (629) (200 OK)
631
INITIATE SESSION INCLUDING THIRD MEDIA
RESPONSE MESSAGE (633) (200 OK)
635
MODIFY SESSION SUCH THAT FIRST, SECOND, THIRD AND FOURTH MEDIA ARE INCLUDED

FIG.6B

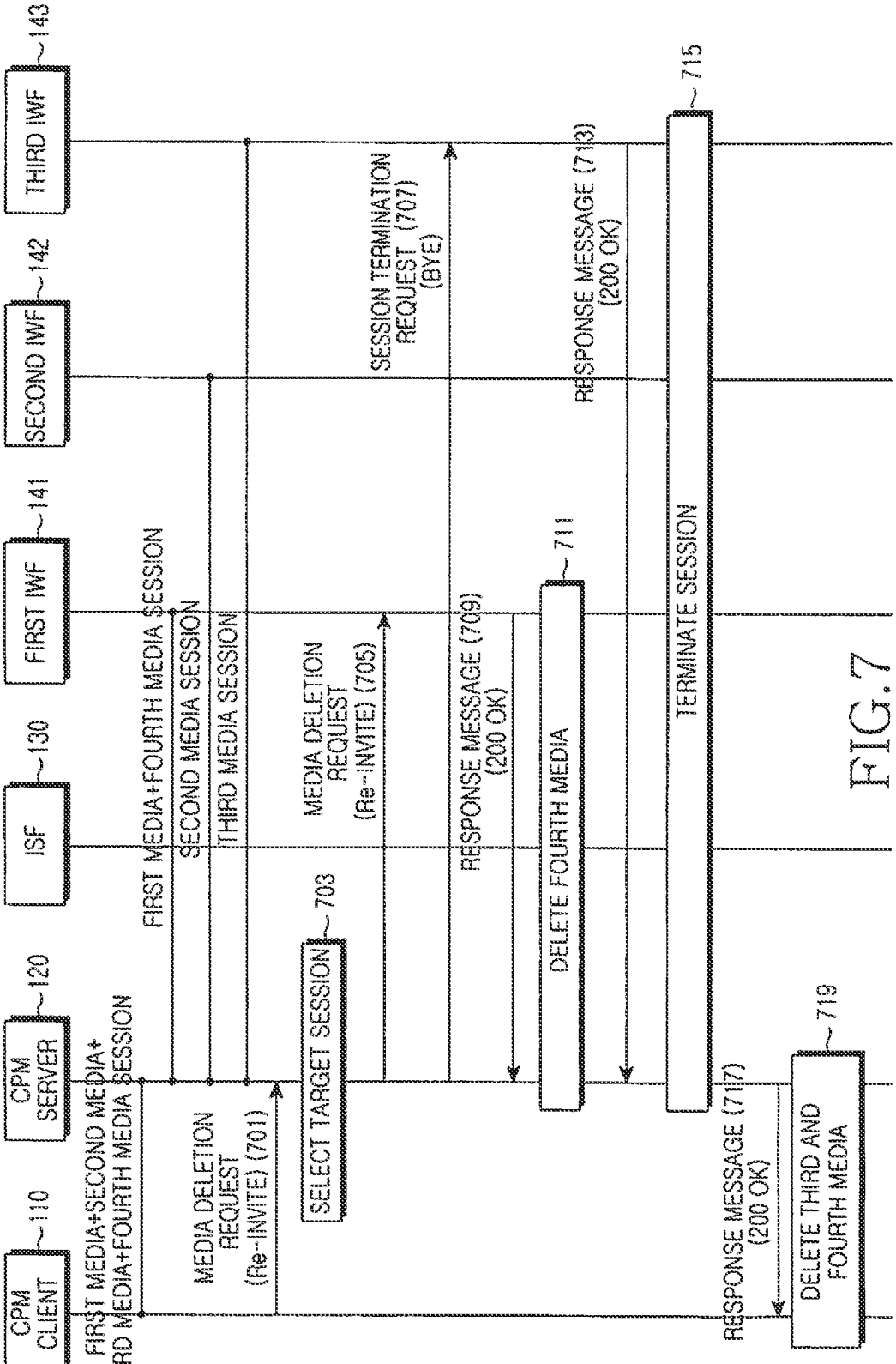
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
FIRST MEDIA+SECOND MEDIA+ THIRD MEDIA+FOURTH MEDIA $ESSION
FIRST MEDIA+FOURTH MEDIA $ESSION
SECOND MEDIA SESSION
THIRD MEDIA SESSION
MEDIA DELETION REQUEST (Re-INVITE) (701)
SELECT TARGET SESSION
703
MEDIA DELETION REQUEST (Re-INVITE) (705)
SESSION TERMINATION REQUEST (707)
(BYE)
RESPONSE MESSAGE (709) (200 OK)
DELETE FOURTH MEDIA
711
RESPONSE MESSAGE (713) (200 OK)
TERMINATE SESSION
715
RESPONSE MESSAGE (717) (200 OK)
DELETE THIRD AND FOURTH MEDIA
719

FIG. 7

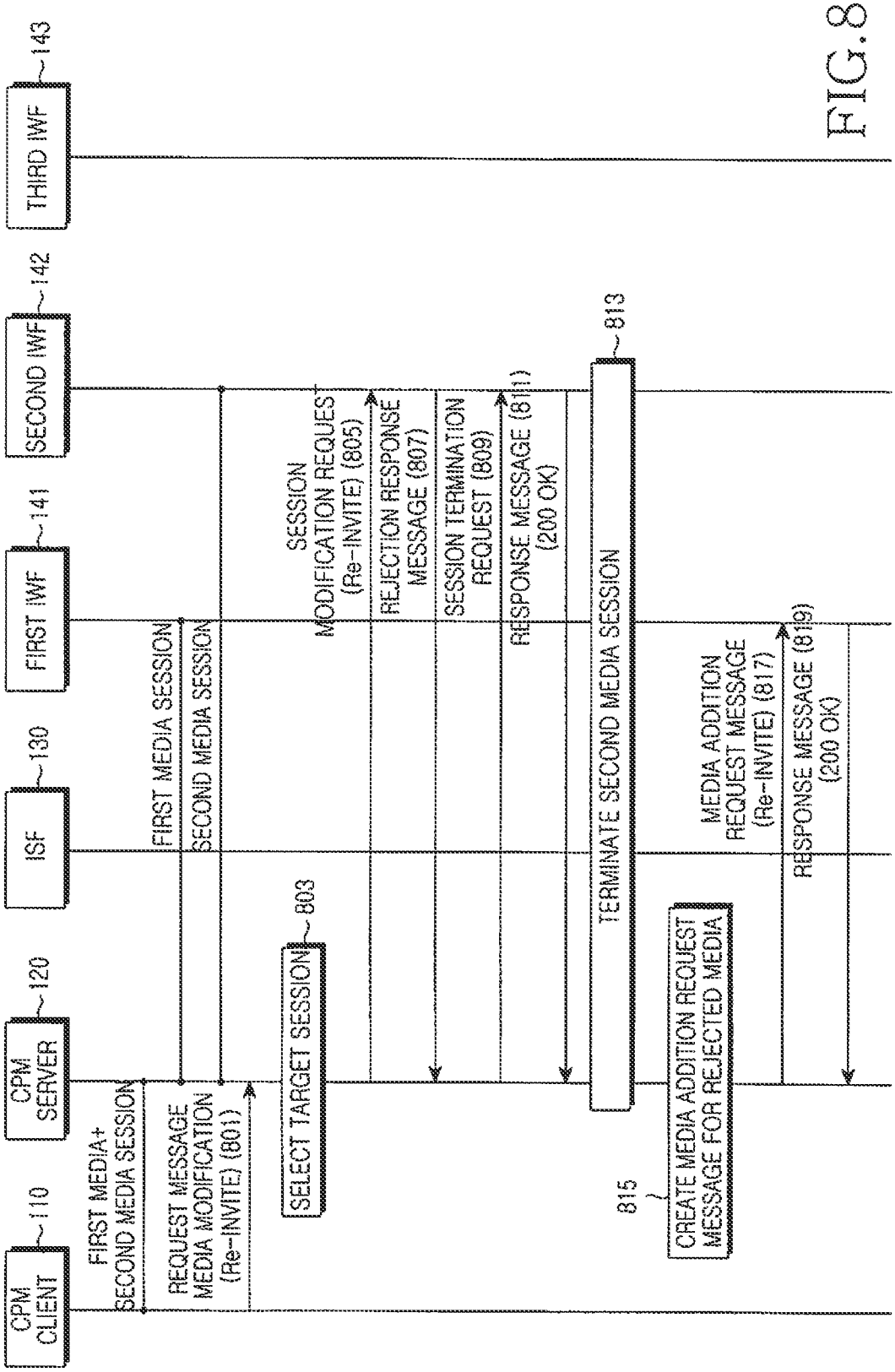
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
FIRST MEDIA+ SECOND MEDIA SESSION
REQUEST MESSAGE MEDIA MODIFICATION (Re-INVITE) (801)
FIRST MEDIA SESSION
SECOND MEDIA SESSION
SELECT TARGET SESSION
803
SESSION MODIFICATION REQUES (Re-INVITE) (805)
REJECTION RESPONSE MESSAGE (807)
SESSION TERMINATION REQUEST (809)
RESPONSE MESSAGE (811) (200 OK)
TERMINATE SECOND MEDIA SESSION
813
815
CREATE MEDIA ADDITION REQUEST MESSAGE FOR REJECTED MEDIA
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (817)
RESPONSE MESSAGE (819) (200 OK)

FIG.8A

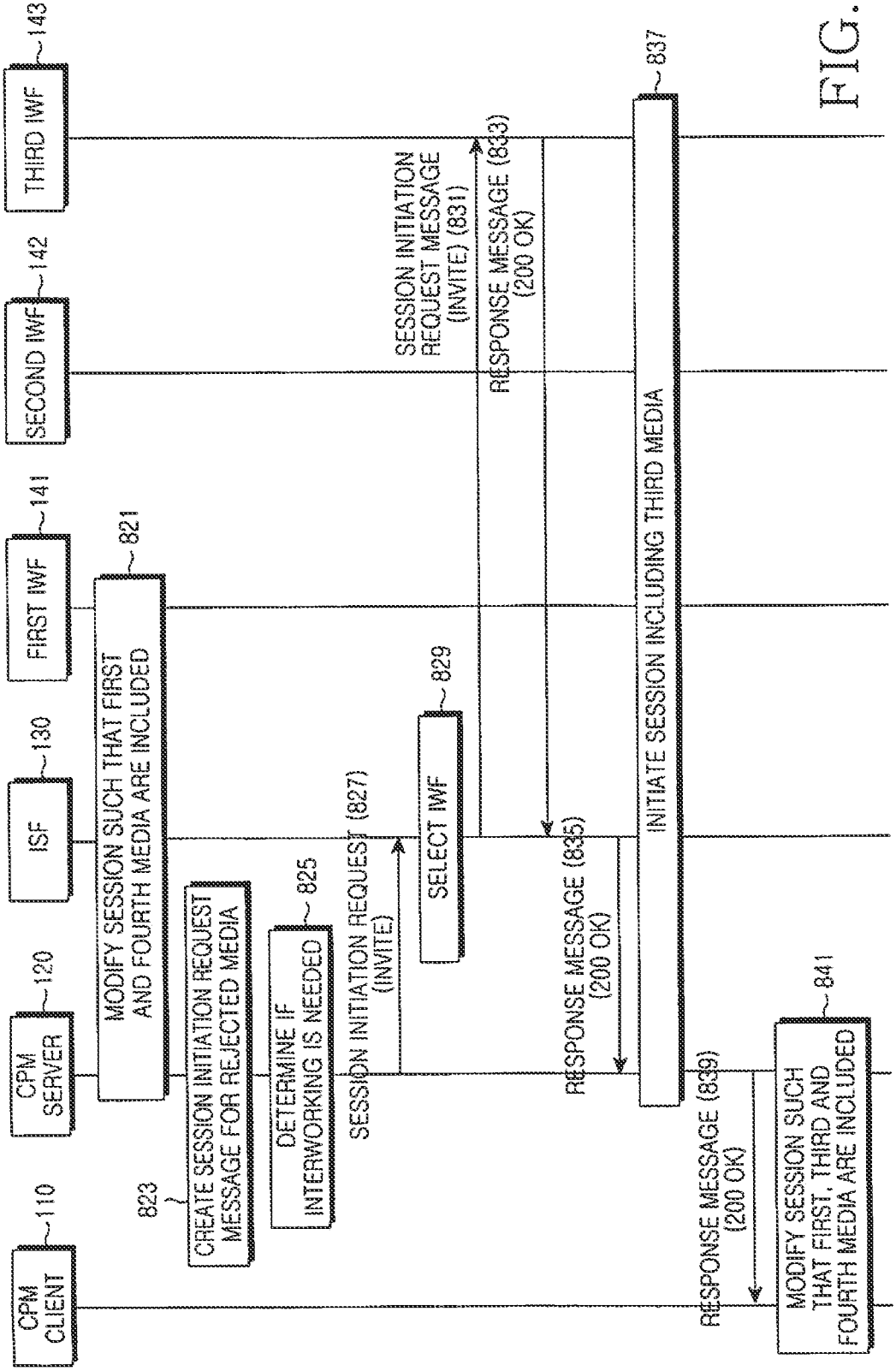
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
MODIFY SESSION SUCH THAT FIRST AND FOURTH MEDIA ARE INCLUDED
821
823
CREATE SESSION INITIATION REQUEST MESSAGE FOR REJECTED MEDIA
DETERMINE IF INTERWORKING IS NEEDED
825
SESSION INITIATION REQUEST (827) (INVITE)
SELECT IWF
829
SESSION INITIATION REQUEST MESSAGE (INVITE) (831)
RESPONSE MESSAGE (833) (200 OK)
RESPONSE MESSAGE (835) (200 OK)
INITIATE SESSION INCLUDING THIRD MEDIA
837
RESPONSE MESSAGE (839) (200 OK)
MODIFY SESSION SUCH THAT FIRST, THIRD AND FOURTH MEDIA ARE INCLUDED
841

FIG.8B

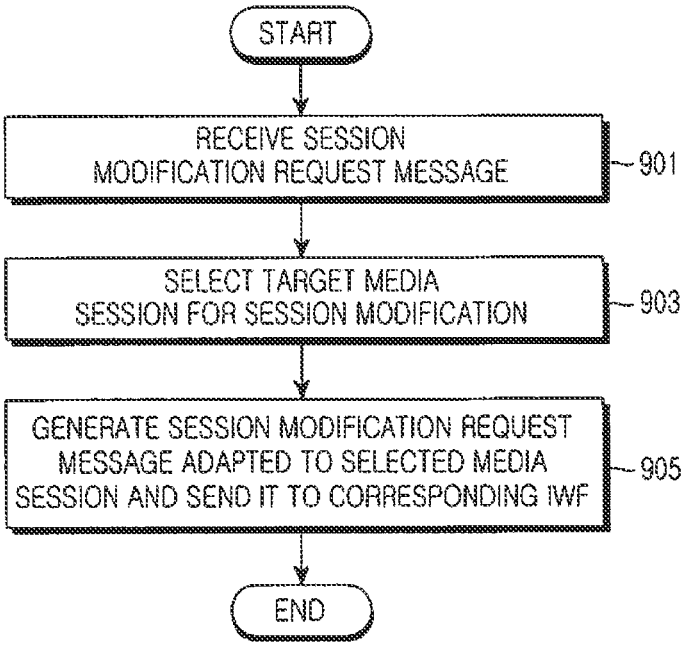
START
RECEIVE SESSION MODIFICATION REQUEST MESSAGE
901
SELECT TARGET MEDIA SESSION FOR SESSION MODIFICATION
903
GENERATE SESSION MODIFICATION REQUEST MESSAGE ADAPTED TO SELECTED MEDIA SESSION AND SEND IT TO CORRESPONDING IWF
905
END

FIG.9

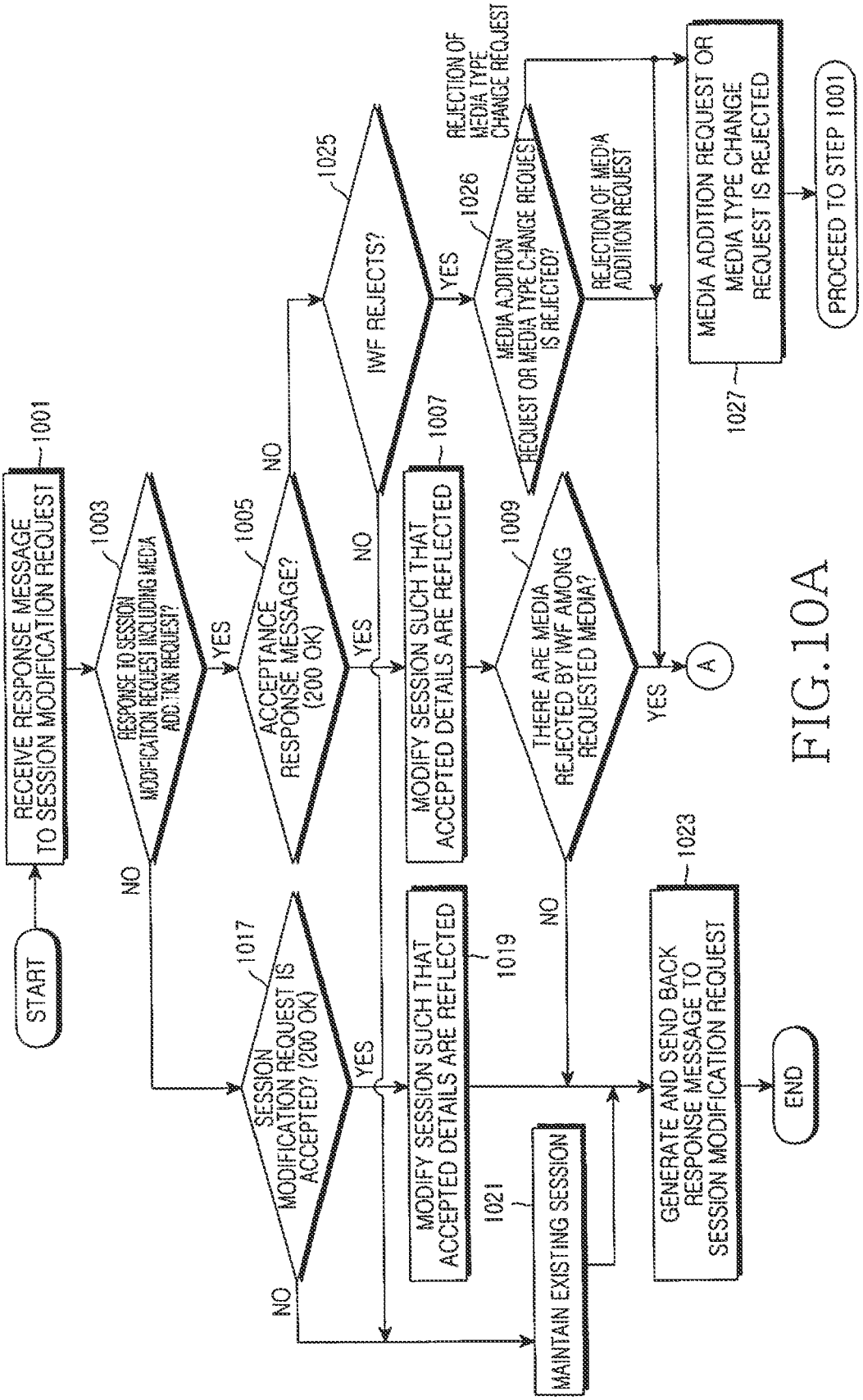
START
RECEIVE RESPONSE MESSAGE TO SESSION MODIFICATION REQUEST
1001
RESPONSE TO SESSION MODIFICATION REQUEST INCLUDING MEDIA ADDITION REQUEST?
1003
YES
NO
ACCEPTANCE RESPONSE MESSAGE? (200 OK)
1005
YES
NO
IWF REJECTS?
1025
YES
MEDIA ADDITION REQUEST OR MEDIA TYPE CHANGE REQUEST IS REJECTED?
1026
REJECTION OF MEDIA TYPE CHANGE REQUEST
REJECTION OF MEDIA ADDITION REQUEST
MODIFY SESSION SUCH THAT ACCEPTED DETAILS ARE REFLECTED
1007
THERE ARE MEDIA REJECTED BY IWF AMONG REQUESTED MEDIA?
1009
YES
NO
A
MEDIA ADDITION REQUEST OR MEDIA TYPE CHANGE REQUEST IS REJECTED
1027
PROCEED TO STEP 1001
SESSION MODIFICATION REQUEST IS ACCEPTED? (200 OK)
1017
YES
NO
MODIFY SESSION SUCH THAT ACCEPTED DETAILS ARE REFLECTED
1019
MAINTAIN EXISTING SESSION
1021
GENERATE AND SEND BACK RESPONSE MESSAGE TO SESSION MODIFICATION REQUEST
1023
END

FIG. 10A

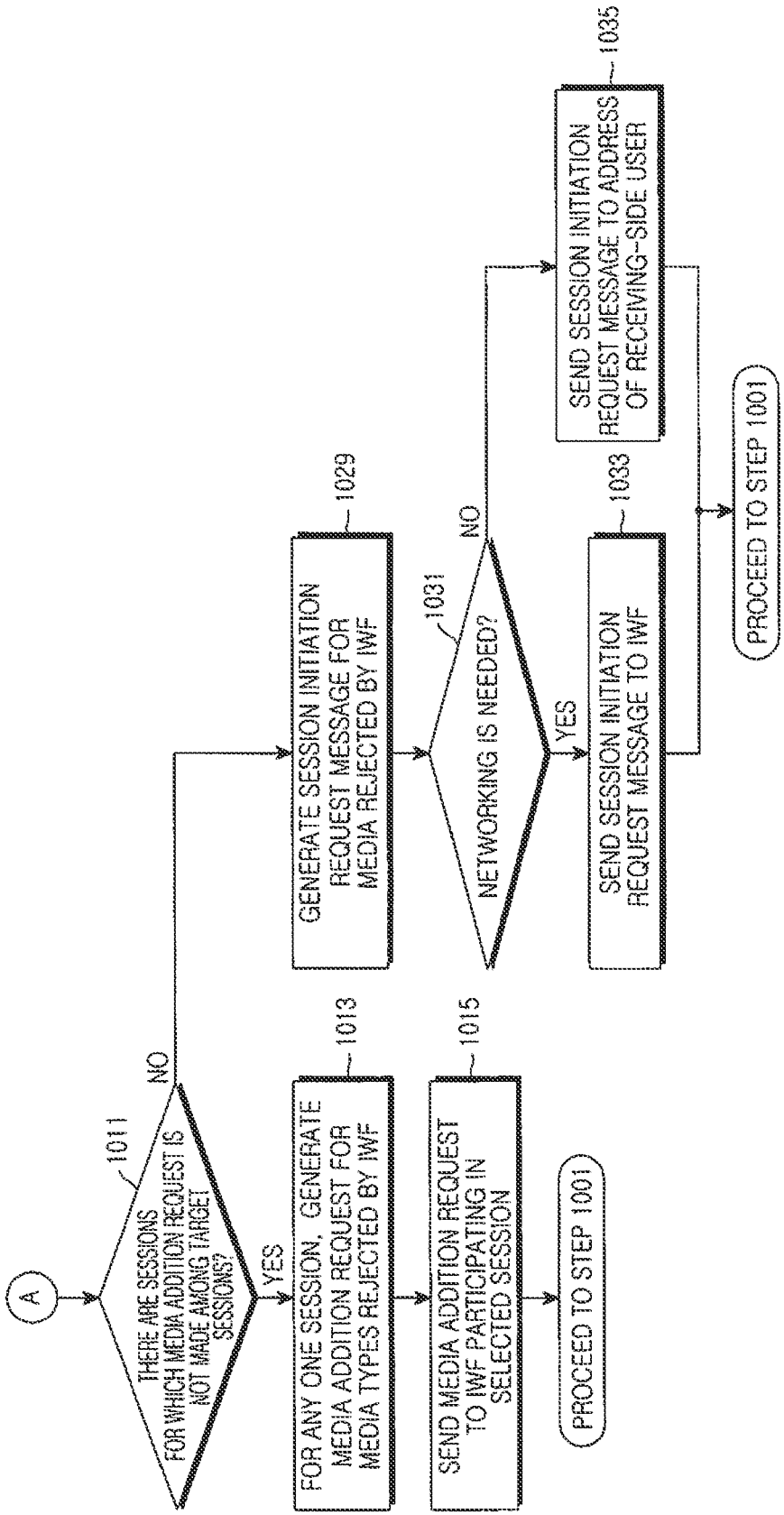
A
1011
THERE ARE SESSIONS FOR WHICH MEDIA ADDITION REQUEST IS NOT MADE AMONG TARGET SESSIONS?
NO
YES
1013
FOR ANY ONE SESSION, GENERATE MEDIA ADDITION REQUEST FOR MEDIA TYPES REJECTED BY IWF
1015
SEND MEDIA ADDITION REQUEST TO IWF PARTICIPATING IN SELECTED SESSION
PROCEED TO STEP 1001
1029
GENERATE SESSION INITIATION REQUEST MESSAGE FOR MEDIA REJECTED BY IWF
1031
NETWORKING IS NEEDED?
NO
YES
1033
SEND SESSION INITIATION REQUEST MESSAGE TO IWF
1035
SEND SESSION INITIATION REQUEST MESSAGE TO ADDRESS OF RECEIVING-SIDE USER
PROCEED TO STEP 1001

FIG. 10B

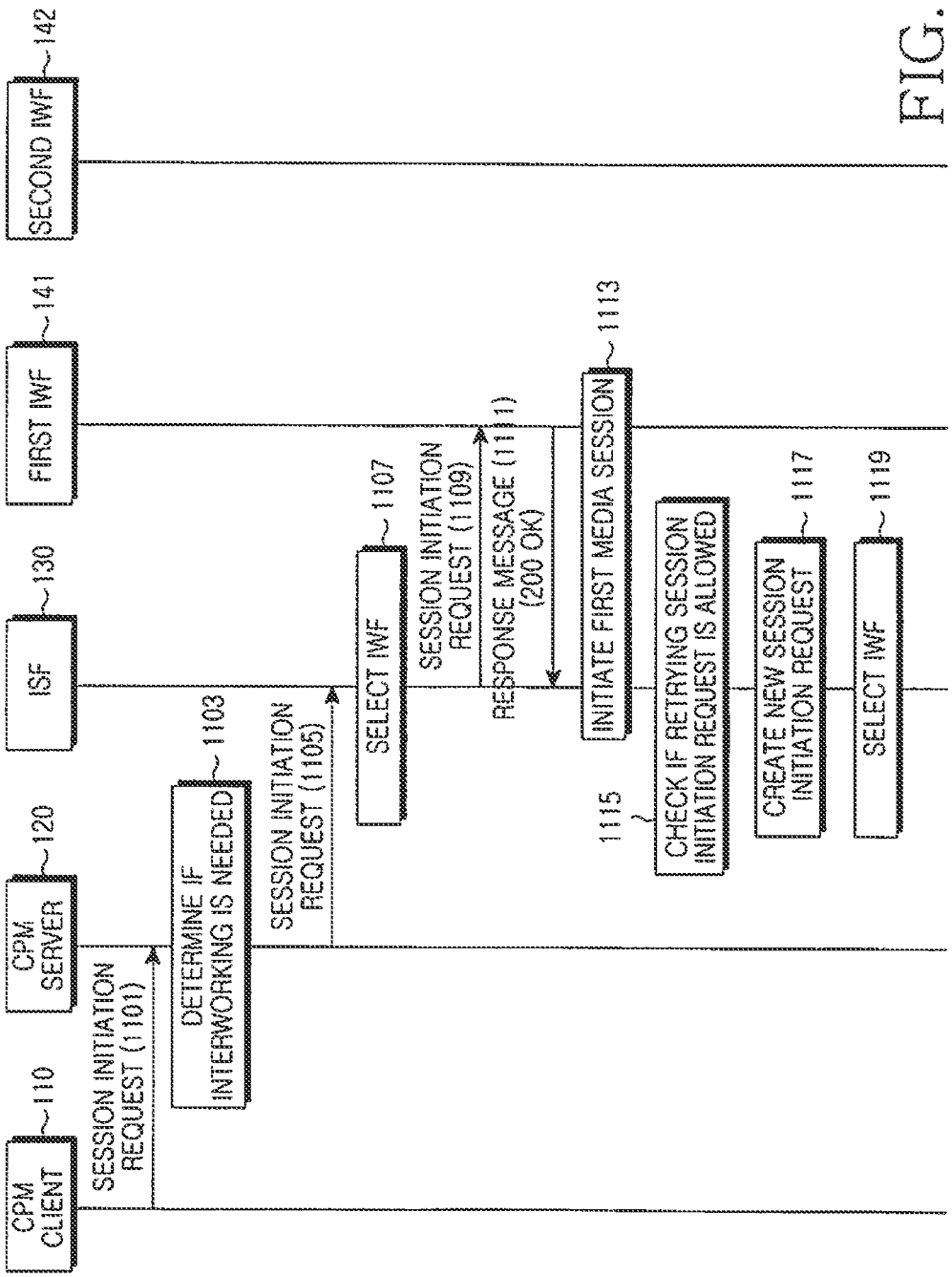
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
SESSION INITIATION REQUEST (1101)
DETERMINE IF INTERWORKING IS NEEDED
1103
SESSION INITIATION REQUEST (1105)
SELECT IWF
1107
SESSION INITIATION REQUEST (1109)
RESPONSE MESSAGE (1111) (200 OK)
INITIATE FIRST MEDIA SESSION
1113
1115
CHECK IF RETRYING SESSION INITIATION REQUEST IS ALLOWED
CREATE NEW SESSION INITIATION REQUEST
1117
SELECT IWF
1119

FIG. 11A

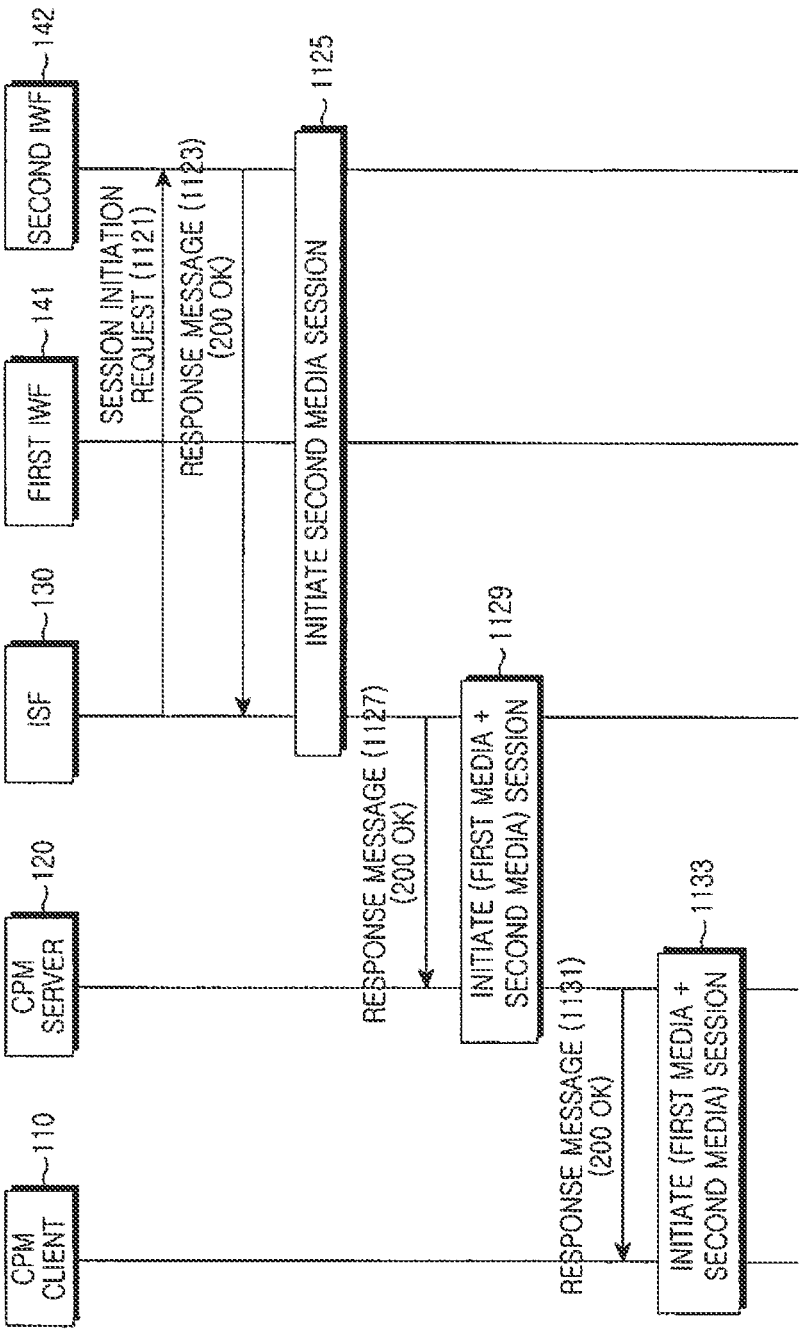
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
SESSION INITIATION REQUEST (1121)
RESPONSE MESSAGE (1123) (200 OK)
INITIATE SECOND MEDIA SESSION
1125
RESPONSE MESSAGE (1127) (200 OK)
INITIATE (FIRST MEDIA + SECOND MEDIA) SESSION
1129
RESPONSE MESSAGE (1131) (200 OK)
INITIATE (FIRST MEDIA + SECOND MEDIA) SESSION
1133

FIG. 11B

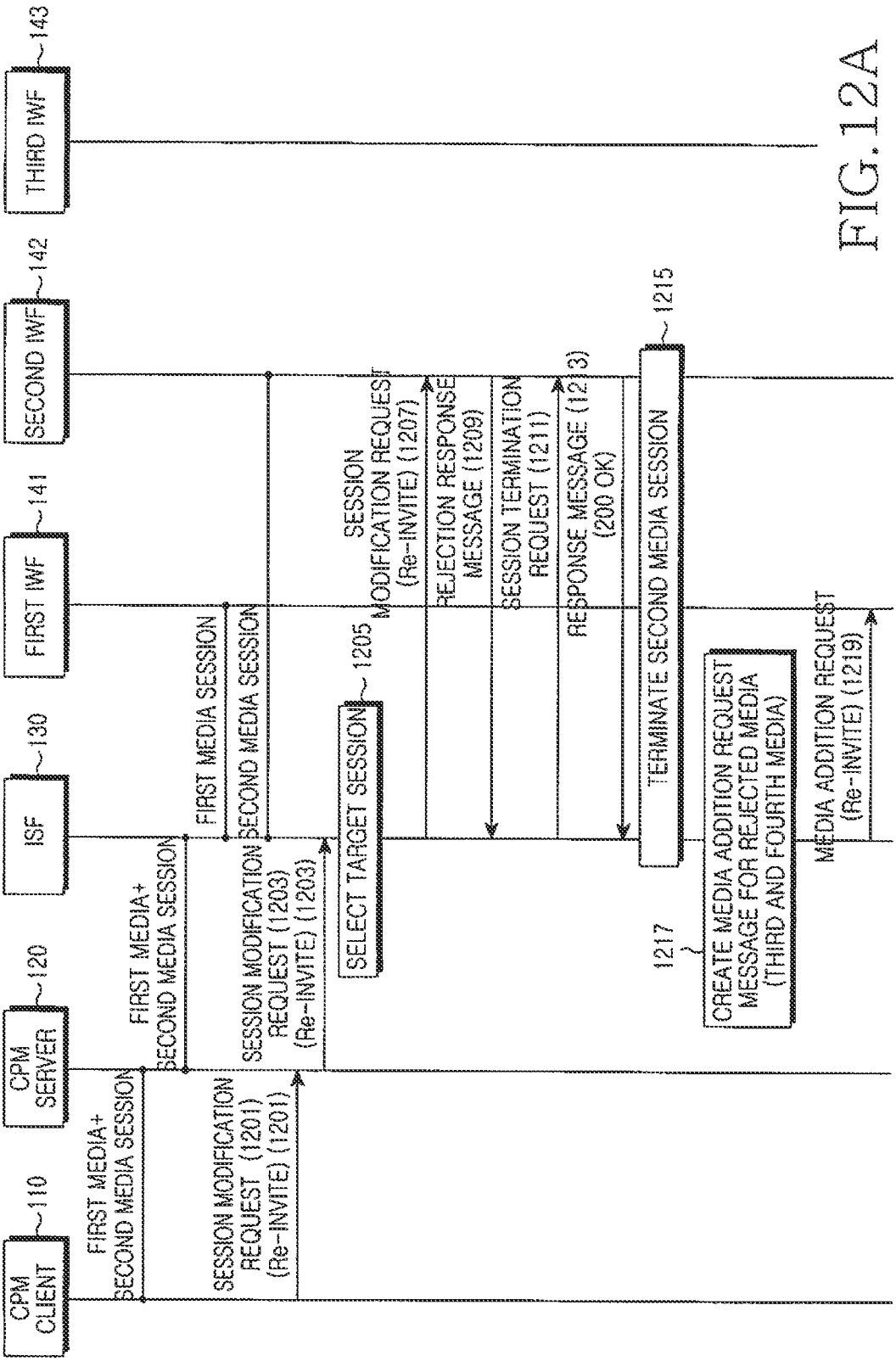
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
FIRST MEDIA+ SECOND MEDIA SESSION
SESSION MODIFICATION REQUEST (1201) (Re-INVITE) (1201)
FIRST MEDIA+ SECOND MEDIA SESSION
FIRST MEDIA SESSION
SECOND MEDIA SESSION
SESSION MODIFICATION REQUEST (1203) (Re-INVITE) (1203)
SELECT TARGET SESSION
1205
SESSION MODIFICATION REQUEST (Re-INVITE) (1207)
REJECTION RESPONSE MESSAGE (1209)
SESSION TERMINATION REQUEST (1211)
RESPONSE MESSAGE (1213) (200 OK)
TERMINATE SECOND MEDIA SESSION
1215
1217
CREATE MEDIA ADDITION REQUEST MESSAGE FOR REJECTED MEDIA (THIRD AND FOURTH MEDIA)
MEDIA ADDITION REQUEST (Re-INVITE) (1219)

FIG. 12A

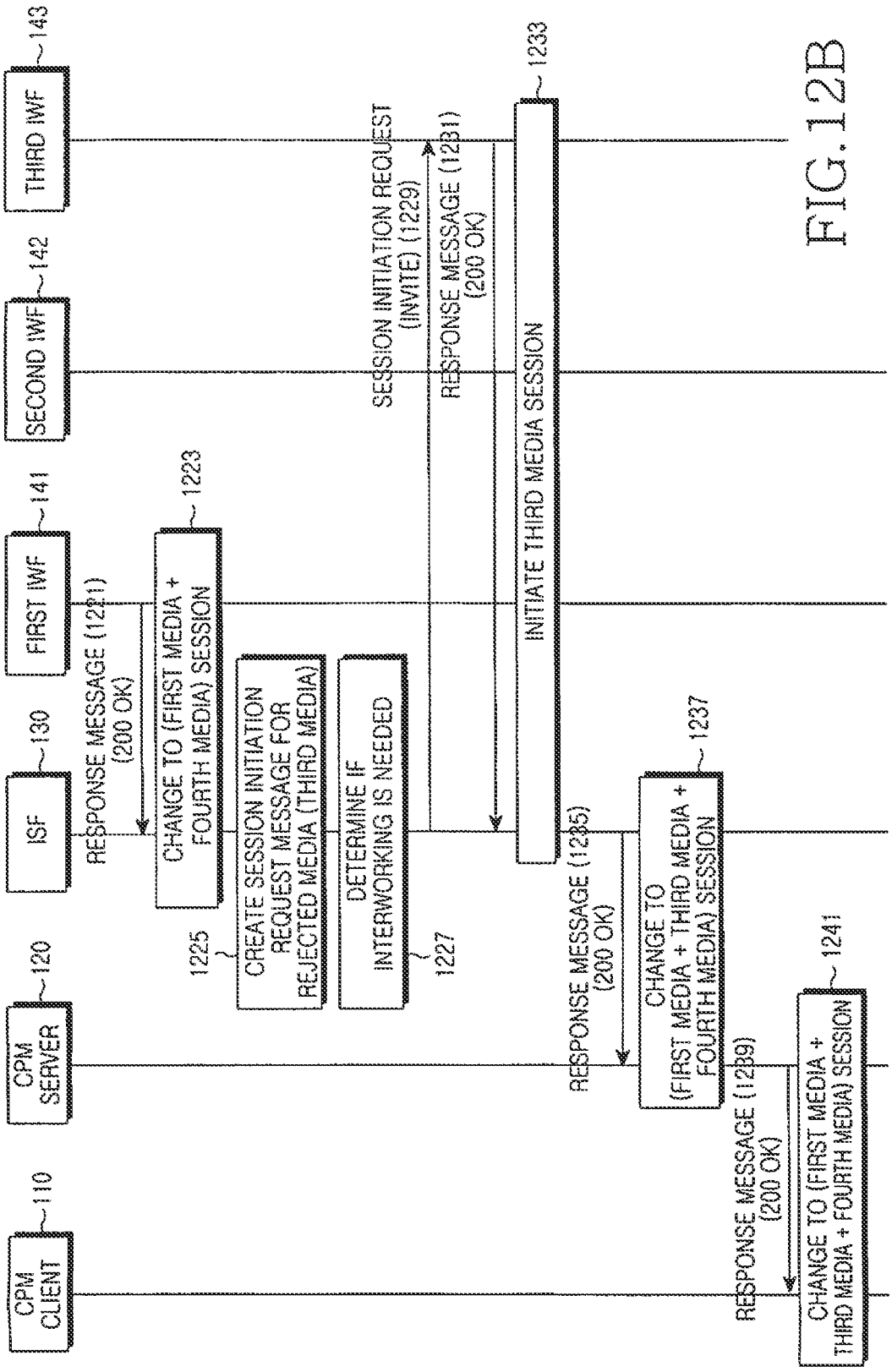
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
RESPONSE MESSAGE (1221) (200 OK)
CHANGE TO (FIRST MEDIA + FOURTH MEDIA) SESSION
1223
1225
CREATE SESSION INITIATION REQUEST MESSAGE FOR REJECTED MEDIA (THIRD MEDIA)
DETERMINE IF INTERWORKING IS NEEDED
1227
SESSION INITIATION REQUEST (INVITE) (1229)
RESPONSE MESSAGE (1231) (200 OK)
INITIATE THIRD MEDIA SESSION
1233
RESPONSE MESSAGE (1235) (200 OK)
CHANGE TO (FIRST MEDIA + THIRD MEDIA + FOURTH MEDIA) SESSION
1237
RESPONSE MESSAGE (1239) (200 OK)
CHANGE TO (FIRST MEDIA + THIRD MEDIA + FOURTH MEDIA) SESSION
1241

FIG. 12B

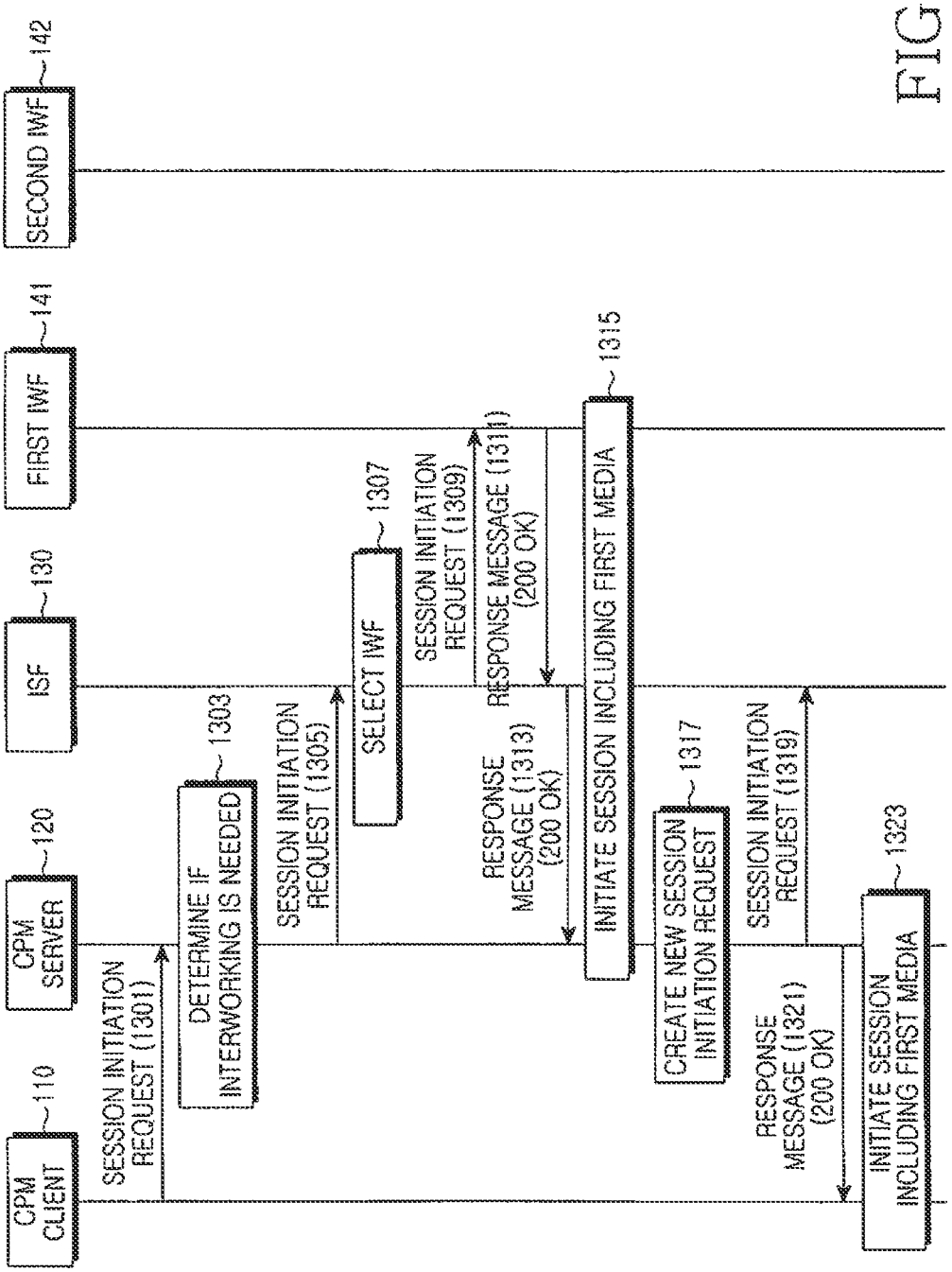
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
SESSION INITIATION REQUEST (1301)
DETERMINE IF INTERWORKING IS NEEDED
1303
SESSION INITIATION REQUEST (1305)
SELECT IWF
1307
SESSION INITIATION REQUEST (1309)
RESPONSE MESSAGE (1311) (200 OK)
RESPONSE MESSAGE (1313) (200 OK)
INITIATE SESSION INCLUDING FIRST MEDIA
1315
CREATE NEW SESSION INITIATION REQUEST
1317
SESSION INITIATION REQUEST (1319)
RESPONSE MESSAGE (1321) (200 OK)
INITIATE SESSION INCLUDING FIRST MEDIA
1323

FIG. 13A

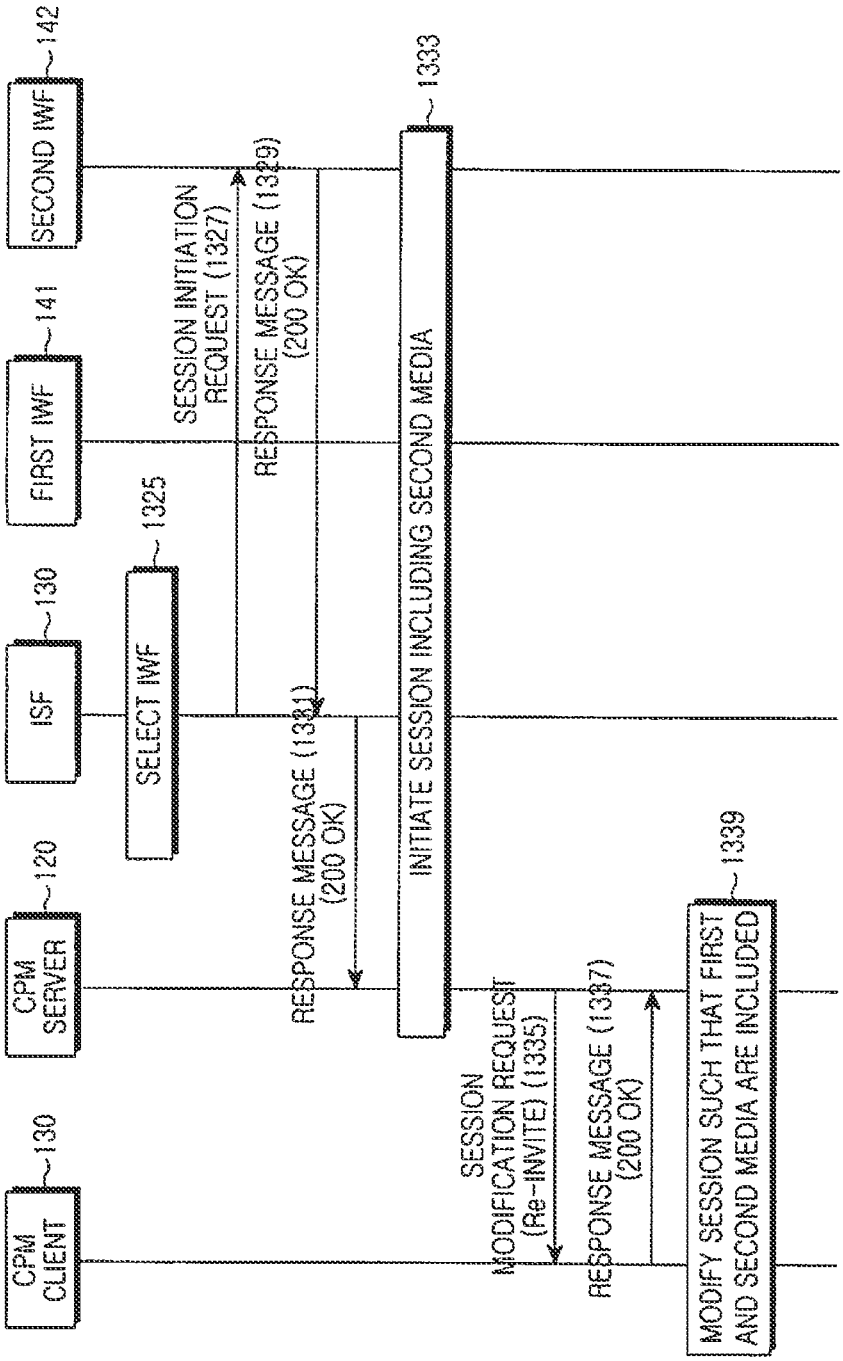
CPM CLIENT
130
CPM SERVER
120
ISF
130
SELECT IWF
1325
FIRST IWF
141
SECOND IWF
142
SESSION INITIATION REQUEST (1327)
RESPONSE MESSAGE (1329) (200 OK)
INITIATE SESSION INCLUDING SECOND MEDIA
1333
RESPONSE MESSAGE (1331) (200 OK)
SESSION MODIFICATION REQUEST (Re-INVITE) (1335)
RESPONSE MESSAGE (1337) (200 OK)
MODIFY SESSION SUCH THAT FIRST AND SECOND MEDIA ARE INCLUDED
1339

FIG. 13B

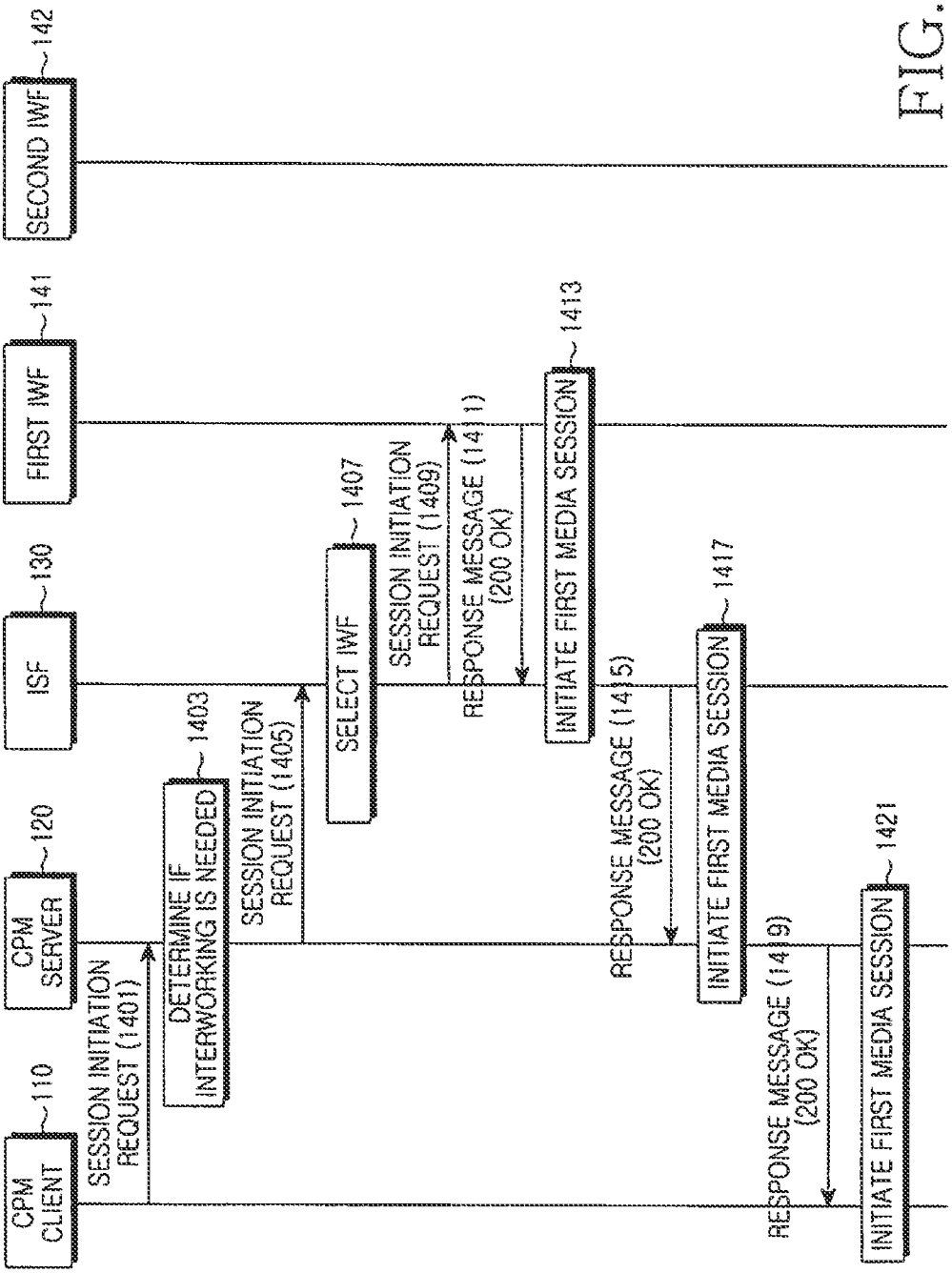
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
SESSION INITIATION REQUEST (1401)
DETERMINE IF INTERWORKING IS NEEDED
1403
SESSION INITIATION REQUEST (1405)
SELECT IWF
1407
SESSION INITIATION REQUEST (1409)
RESPONSE MESSAGE (1411) (200 OK)
INITIATE FIRST MEDIA SESSION
1413
RESPONSE MESSAGE (1415) (200 OK)
INITIATE FIRST MEDIA SESSION
1417
RESPONSE MESSAGE (1419) (200 OK)
INITIATE FIRST MEDIA SESSION
1421

FIG. 14A

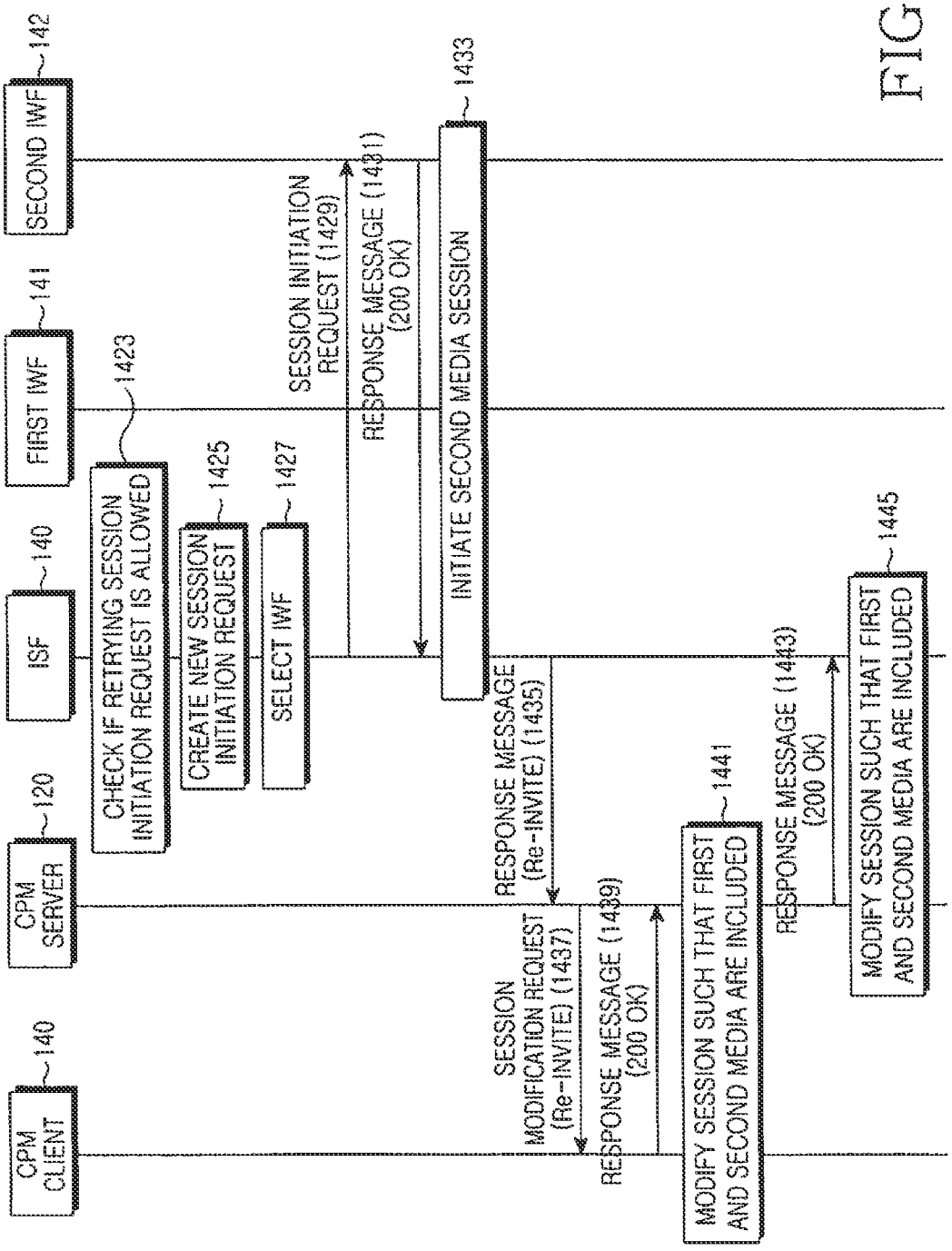
CPM CLIENT
140
CPM SERVER
120
ISF
140
FIRST IWF
141
SECOND IWF
142
CHECK IF RETRYING SESSION INITIATION REQUEST IS ALLOWED
1423
CREATE NEW SESSION INITIATION REQUEST
1425
SELECT IWF
1427
SESSION INITIATION REQUEST (1429)
RESPONSE MESSAGE (1431) (200 OK)
INITIATE SECOND MEDIA SESSION
1433
RESPONSE MESSAGE (Re-INVITE) (1435)
SESSION MODIFICATION REQUEST (Re-INVITE) (1437)
RESPONSE MESSAGE (1439) (200 OK)
MODIFY SESSION SUCH THAT FIRST AND SECOND MEDIA ARE INCLUDED
1441
RESPONSE MESSAGE (1443) (200 OK)
MODIFY SESSION SUCH THAT FIRST AND SECOND MEDIA ARE INCLUDED
1445

FIG. 14B

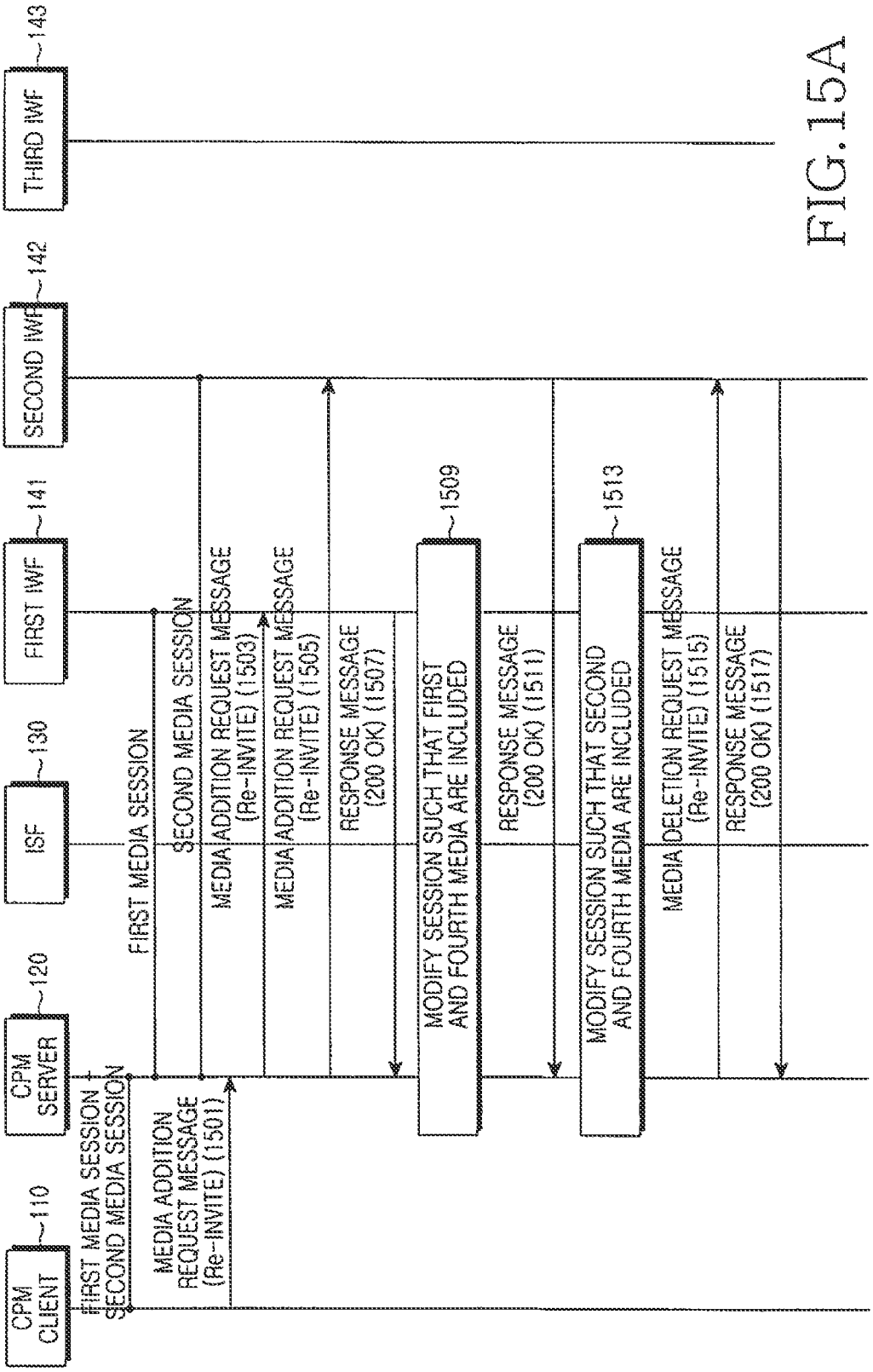
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
FIRST MEDIA SESSION + SECOND MEDIA SESSION
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (1501)
FIRST MEDIA SESSION
SECOND MEDIA SESSION
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (1503)
MEDIA ADDITION REQUEST MESSAGE (Re-INVITE) (1505)
RESPONSE MESSAGE (200 OK) (1507)
1509
MODIFY SESSION SUCH THAT FIRST AND FOURTH MEDIA ARE INCLUDED
RESPONSE MESSAGE (200 OK) (1511)
1513
MODIFY SESSION SUCH THAT SECOND AND FOURTH MEDIA ARE INCLUDED
MEDIA DELETION REQUEST MESSAGE (Re-INVITE) (1515)
RESPONSE MESSAGE (200 OK) (1517)

FIG. 15A

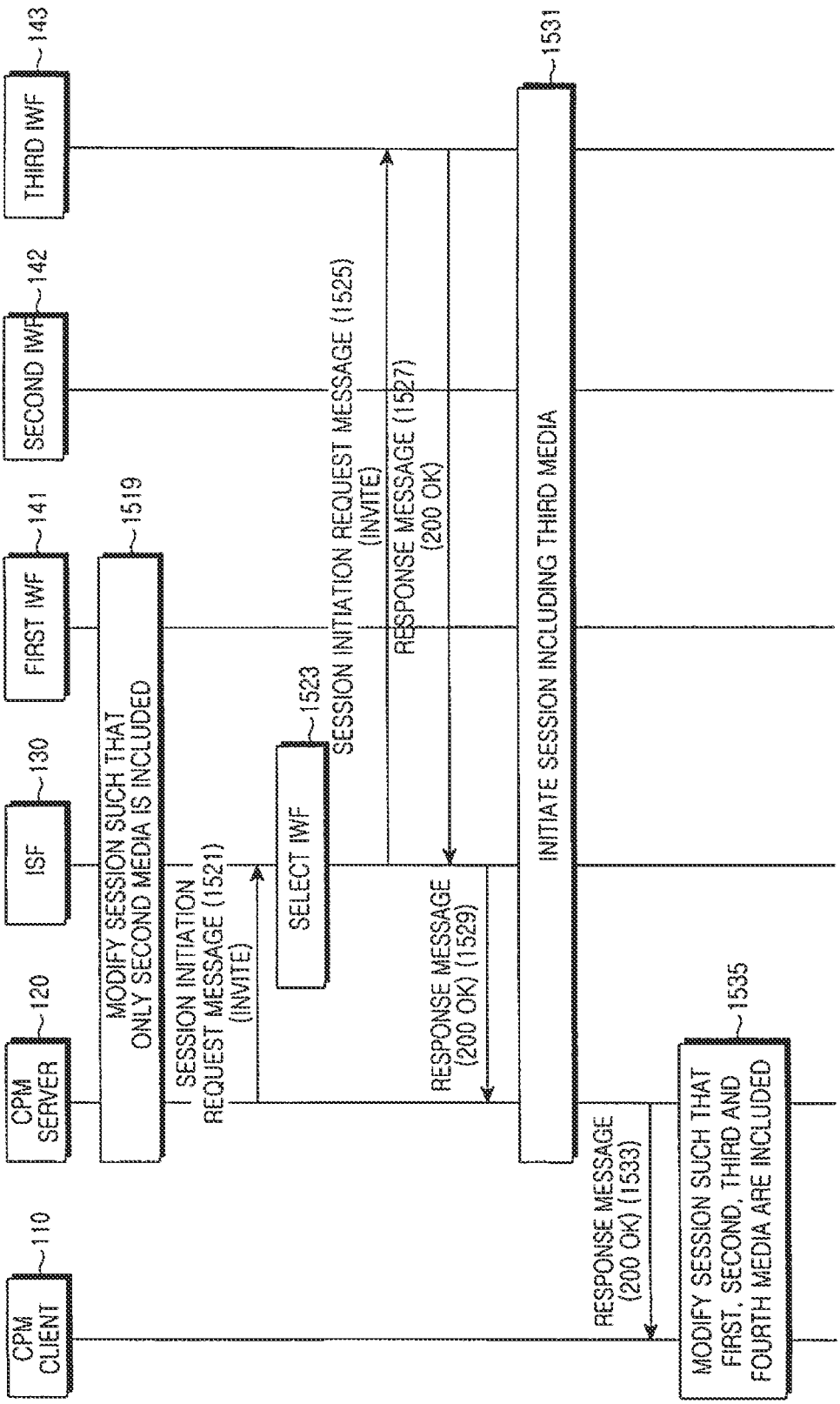
CPM CLIENT
110
CPM SERVER
120
ISF
130
FIRST IWF
141
SECOND IWF
142
THIRD IWF
143
MODIFY SESSION SUCH THAT ONLY SECOND MEDIA IS INCLUDED
1519
SESSION INITIATION REQUEST MESSAGE (1521) (INVITE)
SELECT IWF
1523
SESSION INITIATION REQUEST MESSAGE (1525) (INVITE)
RESPONSE MESSAGE (1527) (200 OK)
RESPONSE MESSAGE (200 OK) (1529)
INITIATE SESSION INCLUDING THIRD MEDIA
1531
RESPONSE MESSAGE (200 OK) (1533)
MODIFY SESSION SUCH THAT FIRST, SECOND, THIRD AND FOURTH MEDIA ARE INCLUDED
1535

FIG.15B

METHOD AND SYSTEM FOR CONTROLLING SESSION FOR INTERWORKING IN CONVERGED IP MESSAGING SERVICE

PRIORITY

This application is a Continuation application of U.S. application Ser. No. 12/627,856, filed on Nov. 30, 2009, which claims priority to applications entitled "Method and System for Controlling Session for Interworking in Converged IP Messaging Service" filed in the Korean Industrial Property Office on Nov. 28, 2008, Dec. 1, 2008, Feb. 2, 2009, and Jun. 22, 2009 and assigned Serial Nos. 10-2008-0120164, 10-2008-0120688, 10-2009-0008186 and 10-2009-0055705, the contents of each of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a method for controlling a session for interworking between a converged IP messaging service and a non-converged IP messaging service, and more particularly to a method for controlling a session in such a manner as to initiate a session between a converged IP messaging service and a non-converged IP messaging service, modifying an already initiated session, and so forth.

2. Description of the Related Art

In the existing mobile environment, terminals perform one-shot messages, such as Short Messaging Service (SMS) messages, Multimedia Messaging Service (MMS) messages, and the like, but users expect messaging services that make it easy to talk with others through an instant messenger in a wired environment. Instant messaging services have been introduced into terminals and networks, based on Session Initiation Protocol/Internet Protocol (SIP/IP) core networks. Also, due to the demand for push-to-talk (e.g. walkie-talkie) from customers and enterprises, Push to talk over Cellular (PoC) services and systems based on SIP/IP core networks have been developed. Furthermore, the rapid change in the market including enterprises and communication business increases the need to integrate and process various types of received messages.

In consideration of this, the Open Mobile Alliance (OMA), a standards body that establishes international open standards for mobile solutions and services, has recently developed technical standards for Converged Internet Protocol (IP) Messaging (CPM) services that are implemented through SIP/IP core networks.

The CPM service is an IP Multimedia Subsystem (IMS)-based messaging service that integrates existing messaging services, such as an SMS, an MMS, etc., into a single service and provides the integrated single service, based on an IP. Unlike the existing messaging services in which transmission/reception is possible within limited networks and terminals, the CPM service provides an IP-based converged service regardless of the kinds of terminals, the types of media, the kinds of networks, and the types of services.

Such a CPM service must be able to integrate and process all types of existing messages. Therefore, the CPM service requires mutual conversion between SMS message formats, MMS message formats, instant messaging service message formats, non-CPM message formats (e.g. PoC), and CPM message formats. The mutual conversion between non-CPM message formats and CPM message formats is referred to as "interworking".

The CPM service supports interworking with various types of non-CPM services. When the sender and receiver of a message belong to different network areas, interworking may be performed in the sender's network or the receiver's network, depending on each service scenario. In order to provide interworking with non-CPM services, a CPM system must configure various network entities. Functions and interrelations of network entities constituting a CPM system will be described with reference to FIG. **1**.

FIG. **1** illustrates entities of a CPM system. The CPM system includes a CPM client **110**, a CPM server **120**, an Interworking Selection Function (ISF) **130**, an Interworking Function (IWF) **140**, an SIP/IP core network **150**, and a remote SIP/IP core network **151**. Although a non-CPM client **111** and a non-CPM server **160** are not entities of the CPM system, they are illustrated in the drawing for the purpose of the description of interworking of the CPM system.

The CPM client **110** refers to a CPM service subscriber. The CPM client **110** generates a converged message to send to the CPM server **120**, and receives a message, which another CPM client or the non-CPM client **111** sends, from the CPM server **120**. The non-CPM client **111** is a client subscribing to a non-CPM service, and exchanges a message with the corresponding non-CPM server **160**.

The CPM server **120** processes a message received from the CPM client **110** or another CPM server. To this end, the CPM server **120** determines if interworking is needed. That is, the CPM server **120** determines if interworking is needed for the received message in order to communicate with the non-CPM server **160**.

For example, if the CPM server **120** determines that interworking is needed, then the CPM server **120** delivers a received message to the ISF **130**. If the CPM server **120** determines that interworking is not needed, then the CPM server **120** delivers a received message to a receiving CPM client or a CPM server to which the receiving CPM client belongs. That is, when a receiving CPM client belongs to the same network area as the CPM server **120**, the CPM server **120** delivers a received message to the receiving CPM client. However, when a receiving CPM client belongs to a different network area from the CPM server **120**, the CPM server **120** delivers a received message to a CPM server of the different network area. Also, the CPM server **120** delivers a message, received from the ISF **130** or the IWF **140** for interworking, to the non-CPM client **111** corresponding to the destination address of the received message.

The ISF **130** selects a non-CPM server **160** that can most effectively deliver a message, received from the CPM server **120**, to a receiving party, and delivers the received message to the IWF **140** that is actually responsible for interworking with the selected non-CPM server **160**.

The IWF **140** is a functional entity for providing direct interworking with a non-CPM service, and performs mutual conversion between the formats of CPM and non-CPM service messages to then deliver the converted message to the non-CPM server **160**.

The SIP/IP core network **150** is a functional entity for delivering control signals of SIP-based services, messages generated by clients or service entities thereof, etc. to receivers or other entities. To this end, the SIP/IP core network **150** may exchange messages with SIP/IP core networks belonging to other provider areas.

The remote SIP/IP core network **151** is an SIP/IP core network provided and managed by another network provider, and has the same function as the SIP/IP core network **150**. Although not illustrated in FIG. **1**, entities, devices, and sys-

tems for providing CPM and non-CPM services may be implemented in the remote SIP/IP core network **151**.

The non-CPM server **160** serves to provide messaging services excluding the CPM service. The messaging services provided by the non-CPM server **150** include an SMS, an MMS, an instant messaging service, PoC, and the like.

Reference will now be made to an interworking operation with reference to FIG. **2**. FIG. **2** illustrates message sending/receiving for interworking between a CPM service and a non-CPM service. In particular, FIG. **2** shows message sending/receiving on the assumption that a sending CPM client **110** requests a receiving non-CPM client **111** to set up a session, and any media type requested by the CPM client **110** can be processed in any single IWF.

In step **201**, the CPM client **110** sends to a CPM server **120** an INVITE message requesting session initiation. The INVITE message includes necessary information for session initiation in the form of a Session Description Protocol (SDP).

In step **203**, on receiving the INVITE message from the CPM client **110**, the CPM server **120** checks if the receiving client is a CPM service subscriber and is in an available state, thereby determining if interworking is needed. Interworking is needed when the receiving client is a non-CPM client, and is not needed when the receiving client is a CPM client and is in an available state, or the receiving client is a CPM client and is in an unavailable state. It is assumed here that the receiving client is a non-CPM client **111**. Thus, in step **205**, the CPM server **120** delivers to the ISF **130** the INVITE message. However, if interworking is not needed, then a different operation is performed. That is, when the receiving client is a CPM client and is in an available state, the INVITE message is delivered to the receiving CPM client to initiate a session. Also, when the receiving client is a CPM client and is in an unavailable state, the INVITE message may be deleted, temporarily stored in the CPM server **120**, or delivered to the ISF **130** for message forwarding through the non-CPM service, according to user settings. However, this scenario is not illustrated in the drawing.

In consideration of the presence and preference of the receiving client, media types requested by the INVITE message, a service to which the receiving client subscribes, etc., the ISF **130** selects in step **207** an IWF **140** that is most suitable to perform interworking between the CPM service and the non-CPM service, and delivers the INVITE message to the selected IWF **140** in step **209**. The presence refers to information including the type of a service to which a client subscribes, and the preference refers to user settings, etc.

In step **211**, on receiving the INVITE message, the IWF **140** determines if it can support media types which are included in the INVITE message and for which session initiation is requested. Assuming that the IWF **140** can support the requested media types, in step **211**, the IWF **140** converts the received INVITE message into a non-CPM message, based on a format suitable for the non-CPM service. For reference, the INVITE message is converted as follows: a specific header, parameter, or SDP body in the INVITE message is adapted to the corresponding non-CPM message format when the non-CPM service supportable by the IWF **140** is an SIP-based service, such as SIMPLE IM, POC, etc., and the INVITE message is converted into a message format suitable for the protocol of the corresponding non-CPM service when the non-CPM service supportable by the IWF **140** is a non-SIP-based service, such as an SMS, an MMS, etc.

If none of the requested media types can be supported by the IWF **140**, then the IWF **140** sends a corresponding response message (e.g. "415 Unsupported Media Type") to the ISF **130**. On receiving the "415 Unsupported Media Type" message, the ISF **130** may deliver the message to the sending CPM client **110** via the CPM server **120**, or select another IWF and retry interworking, depending on the service policy. Also, if some of the requested media types can be supported by the IWF **140**, then the session request for unsupported media types is omitted in the process of the message conversion.

In step **213**, the IWF **140** delivers the converted non-CPM message to the corresponding non-CPM server **160**, which in turn delivers the converted non-CPM message to the receiving non-CPM client **111** in step **215**. In steps **217** and **219**, the non-CPM client **111** delivers a response message to the IWF **140** via the non-CPM server **160**, in response to the non-CPM message received from the non-CPM server **160**.

In step **221**, the IWF **140** converts the response message, received via the non-CPM server **160**, into a message suitable for the CPM message format, for example, an OK message according to the SIP message format, and then in step **223**, delivers the converted response message to the ISF **130**. In step **225**, the ISF **130** delivers the converted response message to the CPM server **120**.

In step **227**, the CPM server **120** initiates a session for allowed media types with the IWF **140**, and then in step **229**, sends an OK message, a response message to the session initiation message in step **201**, to the sending CPM client **110**. Subsequently, in step **231**, the CPM client initiates a session for sending/receiving of the allowed media types with the CPM server **120**.

However, the above-mentioned interworking operation in the conventional CPM system has the following problem. When only some of media types requested by the CPM client **110** can be supported by the IWF **140**, interworking is not performed for unsupported media types, and thus they cannot be provided with the CPM service, as described in step **211**. Since this leads to a deterioration of the quality of the CPM service, there is a need to minimize such a restriction.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been made to solve at least the above-mentioned problems occurring in the prior art, and the present invention provides a method for supporting interworking even for media types unsupported by a specific IWF in a CPM system.

Further, the present invention provides a method for selecting another IWF for a media type unsupported by a specific IWF in a CPM system.

Further, the present invention provides a method for initiating a session with a different IWF according to media types and controlling the initiated session in a CPM system.

Further, the present invention provides a method for modifying a session, which is initiated with a different IWF according to media types, by adding new media to the initiated session in a CPM system.

Further, the present invention provides a method for modifying a session, which is initiated with a different IWF according to media types, by deleting media included in the initiated session in a CPM system.

Further, the present invention provides a method for modifying a session, which is initiated with a different IWF according to media types, by deleting media included in the initiated session and adding new media to the initiated session in a CPM system.

In accordance with an aspect of the present invention, a session control method is provided in a CPM server for supporting a CPM session between a first client subscribing to a

CPM service and a second client not subscribing to the CPM service. After the CPM session is initiated between the first and second clients through the CPM server and an IWF, a session modification request message including specific media is received from the first client. The session modification request message including the specific media is sent to the IWF through the initiated CPM session. A response message is received from the IWF. The response message includes a reason for rejection when the specific media is unsupported by the IWF.

In accordance with another aspect of the present invention, a session control method is provided in an IWF for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. After the CPM session is initiated between the first and second clients through a CPM server and the IWF, a session modification request message including specific media is received from the first client through the CPM server. When the specific media is unsupported by the IWF, a response message is sent to the CPM server. The response message includes a reason for rejection, which is an indication that the specific media is unsupported by the IWF.

In accordance with an additional aspect of the present invention, an interworking apparatus is provided for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. The interworking apparatus includes at least one IWF for supporting a specific media, and generating a reason for rejection, which is an indication that the specific media is unsupported by the IWF, when receiving an interworking request for the specific media unsupported by the IWF. The interworking apparatus also includes an ISF for selecting an entity to undertake interworking of the specific media among the at least one IWF when receiving a session modification request message including the specific media from the first client through a CPM server after the CPM session is initiated between the first and second clients through the CPM server and the IWF.

In accordance with yet another aspect of the present invention, a session control method is provided in a CPM server for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. A session initiation message including specific media is received from the first client. The session initiation message including the specific media is sent to an IWF through an ISF. A response message is received from the IWF through the ISF. The response message includes a reason for rejection when the specific media is unsupported by the IWF.

In accordance with still yet another aspect of the present invention, a session control method is provided in an IWF for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. A session initiation message including specific media is received from the first client through a CPM server. When the specific media is unsupported by the IWF, a response message is sent to the CPM server. The response message includes a reason for rejection, which is an indication that the specific media is unsupported by the IWF.

In accordance with a further aspect of the present invention, an interworking apparatus is provided for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service. The interworking apparatus includes at least one IWF for supporting specific media, and generating a reason for rejection, which is an indication that the specific media is unsupported by the IWF, when receiving an interworking request for the specific media unsupported by the IWF. The interworking apparatus also includes an ISF for selecting an entity to undertake interworking of the specific media among the at least one IWF when receiving a session initiation request message including the specific media from the first client through a CPM server.

In accordance with still yet another aspect of the present invention, a session control method is provided in a client subscribing to a CPM service. After the CPM session is initiated between the first and second clients through a CPM server and an IWF, a session modification request message including specific media to the CPM server is sent through the initiated CPM session. An acceptance response message is received from the CPM server. The specific media is sent through the initiated CPM session and a new session for an unsupported one of the specific media through other IWF.

In accordance with another aspect of the present invention, a session control method is provided in a client subscribing to a CPM service. A session initiation message including a plurality of media is sent to a CPM server. An acceptance response message is received from the CPM server after a CPM session is initiated between the CPM server and at least one interworking function (IWF) supporting the plurality of media. The plurality of media are sent through the initiated CPM session.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a diagram illustrating entities of a CPM system;

FIG. **2** is a message flowchart for explaining message sending/receiving for interworking between a CPM service and a non-CPM service;

FIGS. **3**A and **3**B are a message flowchart for explaining an operation of initiating a session in a proxy mode of a CPM system in accordance with a first embodiment of the present invention;

FIG. **4** is a flowchart illustrating an operation of an IWF in a proxy mode in accordance with the first embodiment of the present invention;

FIG. **5** is a flowchart illustrating an operation of a CPM server in a proxy mode in accordance with the first embodiment of the present invention;

FIGS. **6**A and **6**B are a message flowchart for explaining an operation of adding a new media type to an already initiated session in a proxy mode in accordance with a second embodiment of the present invention;

FIG. **7** is a message flowchart for explaining an operation of modifying an already initiated session by deleting a specific media type from the already initiated session in a proxy mode in accordance with a third embodiment of the present invention;

FIGS. **8**A and **8**B are a message flowchart for explaining an operation of modifying an already initiated session by adding a new media type to the already initiated session and simultaneously deleting an existing media type from the already initiated session in a proxy mode in accordance with a fourth embodiment of the present invention;

FIG. **9** is a flowchart illustrating an operation of a CPM server that receives a session modification request in a proxy mode in accordance with the second to fourth embodiments of the present invention;

FIGS. **10**A and **10**B are a flowchart illustrating an operation of a CPM server that receives a response message from an

IWF in a proxy mode in accordance with the second to fourth embodiments of the present invention;

FIGS. **11**A and **11**B are a message flowchart for explaining an operation of initiating a session in a B2BUA mode of a CPM system in accordance with a fifth embodiment of the present invention;

FIGS. **12**A and **12**B are a message flowchart for explaining an operation of modifying an already initiated session by changing a specific media type in a B2BUA mode in accordance with a sixth embodiment of the present invention;

FIGS. **13**A and **13**B are a message flowchart for explaining another operation of initiating a session when an ISF operates in a proxy mode where a message body part is not allowed to be modified in accordance with the first embodiment of the present invention;

FIGS. **14**A and **14**B are a message flowchart for explaining another operation of initiating a session when an ISF operates in a B2BUA mode in accordance with the fifth embodiment of the present invention; and

FIGS. **15**A and **15**B are a message flowchart for explaining an operation of adding new media to an already initiated session when an IWF operates in a proxy mode in accordance with the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENT

Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings. It should be noted that the similar components are designated by similar reference numerals although they are illustrated in different drawings. Also, in the following description, a detailed description of known functions and configurations incorporated herein will be omitted when it may obscure the subject matter of the present invention. Further, it should be noted that only parts essential for understanding the operations according to the present invention will be described and a description of parts other than the essential parts will be omitted in order not to obscure the gist of the present invention.

Before a description of the present invention is given, an Interworking Selection Function (ISF) and an Interworking Function (IWF) to be applied in a Converged IP Messaging (CPM) system of the present invention will be described in detail.

In the present invention, the ISF may be included in a CPM server or the IWF, or may be implemented as an independent entity according to the implementation environment of the CPM system. Alternatively, the ISF and the IWF may be implemented as a single device.

Also, the ISF may operate in a proxy mode or a Back-to-Back User Agent (B2BUA) mode according to the message processing scheme of the CPM system.

In the proxy mode, the major operations of the ISF include IWF selection, message delivery, etc. The message delivery refers to an operation of delivering a message, received from a CPM server, to a selected IWF, delivering a response message, received from the IWF, to the CPM server, and the like. Also, it is possible to allow the ISF to modify a specific header field or parameter of the received message when delivering the received message. However, a message body part is not generally permitted to be modified. Nevertheless, since an exceptional case may occur, in which a message body part may be modified even in the proxy mode according to the design of the CPM system, the present invention proposes that the ISF will operate differently for each of both the cases. However, in the case of the proxy mode where a message body part is permitted to be modified, the IWF is not located on an initiated session, and thus media delivered through the initiated session do not pass through the IWF.

In the B2BUA mode, the major operations of the ISF include IWF selection, and additionally include a User Agent (UA) serving as an IWF for the CPM server or functioning as a CPM server for the IWF. The UA functions as follows: when the ISF receives any message from the CPM server, the UA generates a new message corresponding thereto, and sends the generated message to the CPM server. Thus, for the IWF, the ISF serves as a UA of the CPM server. When the ISF receives any message from the IWF, the ISF generates a new message corresponding thereto, and sends the generated message to the CPM server. Thus, for the CPM server, the ISF serves as a UA of the IWF. In the B2BUA mode, the ISF can control the flow of media delivered through a session by functioning as a UA in this way. Also, in the B2BUA mode, the ISF is located on an initiated session, and thus media delivered through the initiated session passes through the IWF.

Depending on the implementation of the CPM system, a separate IWF for controlling interworking with one specified non-CPM service may be provided for each non-CPM service, or one IWF may control interworking with all non-CPM services or a plurality of non-CPM services. In the specification, embodiments of the present invention will be described on the assumption that a separate IWF is provided for each non-CPM service in the network environment.

First, reference will be made to initial session initiation according to an embodiment of the present invention.

A CPM client sends a session request for media to a CPM server. When interworking is needed, the CPM server delivers the session request to an ISF, and the ISF selects an appropriate IWF and delivers the session request to the selected IWF. The IWF determines whether to allow the session request, and sends a response to the session request. When the IWF rejects the session request, the IWF includes details of rejection in the response.

If a reason for rejection of the session request is that a receiving client gives notification of rejection of the session request, then the rejected session does not need to be requested again. This is because the client party will reject the session request again even when another IWF supports media for which the session request is made. However, if the reason for rejection of the session request is that the IWF cannot support media for which the session request is made, then a session may be initiated by forwarding the session request to another IWF supporting the media.

Therefore, if the IWF includes details of rejection, that is, information on a rejecter or a reason for rejection, in the response to the session request, then whether to forward the rejected session can be determined according to the details of rejection. When the CPM client sends a session request for multiple media, and some of the requested media are rejected, the details of rejection include information on the rejected media. As an example, whether to forward the session request is determined by the CPM server or the ISF.

Next, reference will be made to session modification according to an embodiment of the present invention. The session modification may be largely divided into adding new media to a session, deleting media included in a session, deleting existing media from a session and adding new media to the session, changing existing media types, and so forth. In such cases, a session initiation request is not made and a session modification request is made. When an IWF rejects a session request for adding new media, the IWF sends a response including details of the rejection, and a CPM server

determines how to modify the session by taking account of the details of the rejection. This will be described in detail below.

The present invention may be embodied in the "proxy mode" and the "B2BUA" mode, and embodiments of the present invention will now be described based on the main concept of the present invention.

In a first embodiment of the present invention, an operation of initiating an initial session for multiple media in the proxy mode will be discussed with reference to FIGS. **3** to **5** and **13**.

In a second embodiment of the present invention, an operation of modifying an already initiated session by adding a new media type thereto in the proxy mode will be discussed with reference to FIGS. **6** and **15**.

In a third embodiment of the present invention, an operation of modifying an already initiated session by deleting a specific media type from the already initiated session in the proxy mode will be discussed with reference to FIG. **7**.

In a fourth embodiment of the present invention, an operation of modifying an already initiated session by changing a specific media type will be discussed with reference to FIG. **8**.

In a fifth embodiment of the present invention, an operation of initiating an initial session for multiple media in the B2BUA mode will be discussed with reference to FIGS. **11** and **14**.

In a sixth embodiment of the present invention, an operation of modifying an already initiated session by changing a specific media type in the B2BUA mode will be discussed with reference to FIG. **12**.

ISF: Proxy Mode

A. Case where a Message Body Part is not Permitted to be Modified

FIG. **3** illustrates an operation of initiating a session when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to the first embodiment of the present invention. The operation in FIG. **3** assumes the following conditions:

(1) A CPM client **110** is to initiate a session that includes first and second media.

(2) A receiving client is a non-CPM client, and subscribes to first, second, and third non-CPM services.

(3) A first IWF **141** performs interworking with the first non-CPM service, a second IWF **142** performs interworking with the second non-CPM service, and a third IWF **143** performs interworking with the third non-CPM service.

(4) The first media is supported by the first non-CPM service, but the second media is unsupported by the first non-CPM service. This is the same for the first IWF **141**.

(5) The second media is supported by the second non-CPM service, but the first media is unsupported by the second non-CPM service. This is the same for the second IWF **142**.

(6) Both the first and second media are unsupported by the third non-CPM service. This is the same for the third IWF **143**.

In FIG. **3**, delivery of a session initiation request from each IWF to a receiving non-CPM client and a response thereto are omitted.

In step **301**, the CPM client **110** sends a session initiation request message (INVITE) to a CPM server **120**. In step **303**, on receiving the session initiation request message, the CPM server **120** determines if interworking is needed for the session initiation. In FIG. **3**, since the receiving client is a non-CPM client, interworking is needed. Thus, in step **305**, the CPM server **120** sends the session initiation request message to an ISF **130**.

In step **307**, the ISF **130** selects an IWF, which is most suitable to perform the session initiation, based on information including the preference and presence of the receiving client, the media type for which the session initiation request is made, the service to which the receiving client subscribes, the service policy, etc. It is assumed that the ISF **130** selects the third IWF **143** in step **307**.

In step **309**, the ISF **130** delivers the session initiation request message to the third IWF **143**. In step **311**, the third IWF **143** generates and sends back a rejection response message to the session initiation request message because the third IWF **143** does not support the first and second media. In step **313**, the ISF **130** delivers the received rejection response message to the CPM server **120**. The rejection response message includes details of rejection, for example, information on one or more reasons for the rejection, a rejecter, and rejected media.

A specific code number may be used to include the details of rejection in the rejection response message. All SIP response messages include a unique code number that may vary according to the result of processing an SIP request message corresponding to each response message, a reason for errors, and the like. For example, code number "488" may be included in a corresponding response message when an SIP request message, such as a session initiation request or a media addition request, is rejected by an IWF, and code number "606" may be included in a corresponding response message when an SIP request message is rejected by a receiving client. Theses code numbers are merely illustrative, and code numbers may be changed according to system implementations. However, a case may occur in which the CPM server **120** cannot make an accurate determination only by the code number. This is the case where a request for the initiation of a session supporting multiple media types is made, but some of the multiple media are rejected by a user, and some of them are rejected by an IWF. In this case, a response message must directly or indirectly clarify details of the rejection for each rejected media. The format of a rejection response message clarifying details of rejection for each media will be described below in Tables 1 and 3.

In step **315**, the CPM server **120** can know from the code number of the rejection response message that the session request is rejected by the IWF, and checks if a retrial to initiate the rejected session is allowed. In FIG. **3**, it is assumed that a retrial to make a session initiation request is allowed. Thus, in step **317**, the CPM server **120** sends the session initiation request message to the ISF **130** in order to retry session initiation.

In step **319**, the ISF **130** selects an appropriate IWF. Of course, the IWF having sent back the rejection response message to the previous session request, that is, the third IWF **143**, is not selected. In step **319**, it is assumed that the ISF **130** selects the first IWF **141**. Thus, in step **321**, the ISF **130** delivers the session initiation request message to the first IWF **141**.

Since it is assumed that the first media is supported by the first IWF **141**, and the second media is unsupported by the first IWF **141**, the first IWF **141** can accept the initiation of a session for the first media. Thus, in step **323**, the first IWF **141** generates and sends back an acceptance response message (200 OK). Since the second media is rejected by the first IWF **141**, the first IWF **141** includes information, indicating that the second media is rejected by the first IWF **141**, in the response message according to a method of configuring a partial acceptance response message to a session initiation request, as described below.

In step **325**, the ISF **130** delivers the received response message to the CPM server **120**. In step **327**, a session including the first media is initiated between the CPM server **120** and the first IWF **141**.

In step **329**, the CPM server **120** generates a session initiation request message for the second media rejected by the first IWF **141**, and then in step **331**, sends the generated message to the ISF **130**. In step **333**, the ISF **130** selects an IWF that is most suitable to perform the requested session initiation. Of course, the ISF **130** does not select the first IWF **141** that has sent back the rejection response message to the previous session request including the second media.

In step **333**, it is assumed that the ISF **130** selects the second IWF **142**. Thus, in step **335**, the ISF **130** sends the session initiation request message to the second IWF **142**. In step **337**, the second IWF **142** generates and sends back an acceptance response message (200 OK) to the session initiation request message. In step **339**, the ISF **130** delivers the received response message to the CPM server **120**. Subsequently, in step **341**, a session including the second media is initiated between the CPM server **120** and the second IWF **142**.

In step **343**, the CPM server **120** generates a response message to the session initiation request message received in step **301**, and sends the generated response message back to the CPM client **110**. This response message includes an indication that a session including the first media and a session including the second media are all accepted. Subsequently, in step **345**, a session including the first and second media is initiated between the CPM client **110** and the CPM server **120**.

In FIG. **3**, the ISF **130** and the first to third IWFs **141**, **142**, **143** may be implemented as a single interworking unit. Such a single interworking unit includes a controller (not shown in the drawing). In the case of this device configuration, the ISF **130** can receive a session initiation request message (INVITE) including the first and second media, and select an IWF for taking charge of interworking of the first and second media. If the ISF **130** selects the third IWF **143**, then the ISF **130** sends a media initiation request message to the third IWF **143**. As mentioned above, the third IWF **143** cannot support the first and second media. Thus, the third IWF **143** delivers details of the rejection, indicating that the first and second media are rejected due to the attribute of the third IWF **143**, to the controller (not shown). Based on this reason for the rejection, the controller instructs the ISF **130** to reselect an IWF for the first and second media, and the ISF **130** may reselect an IWF according to the controller's instruction. As another example, the controller may be so designed as to reselect an IWF, based on a reason for rejection.

FIGS. **13**A and **13**B illustrate an operation initiating a session when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to the first embodiment of the present invention.

Comparing the operation of FIG. **13** with that of FIG. **3**, these two operations are different in that the CPM server **120** in FIG. **3** receives all the response messages from the first IWF **141** and the second IWF **142**, and then combines the received response messages to send the combined response messages to the CPM client **110**, but the CPM server **120** in FIG. **13** separately processes the response messages received from the respective IWFs. That is, in FIG. **13**, the CPM server **120** first initiates a session with the CPM client **110**, based on the response message received from an IWF that primarily performs interworking, that is, the first IWF **141**. When the CPM server **120** receives an acceptance response message from an IWF that secondarily performs interworking, that is, the second IWF **142**, the CPM server **120** adds media, additionally accepted by the second IWF **142**, to the session already initiated between the CPM server **120** and the CPM client **110**. In addition, the operation of FIG. **13** assumes the same conditions as those of FIG. **3**, except that the receiving client does not subscribe to the third non-CPM service. Therefore, the operation of FIG. **13** is substantially the same as that of FIG. **3**, except the above-mentioned difference. The operation of FIG. **13** will now be described.

In step **1301**, the CPM client **110** sends a session initiation request message (INVITE) to the CPM server **120**. In step **1303**, on receiving the session initiation request message, the CPM server **120** determines if interworking is needed for the session initiation. In FIG. **13**, since the receiving client is a non-CPM client, interworking is needed. Thus, in step **1305**, the CPM server **120** sends the session initiation request message to the ISF **130**.

In step **1307**, the ISF **130** selects an IWF, which is most suitable to perform the session initiation, based on information including the preference and presence of the receiving client, the media type for which the session initiation request is made, the service to which the receiving client subscribes, the service policy, etc. It is assumed that the ISF **130** selects the first IWF **141** in step **1307**.

In step **1309**, the ISF **130** delivers the session initiation request message to the first IWF **143**. In step **1311**, the first IWF **141** generates and sends back "200 OK" as a response message to the session initiation request message because the first IWF **141** supports the first media. In step **1313**, the ISF **130** delivers the received response message to the CPM server **120**. In step **1311**, the first IWF **141** includes in the response message details indicating that the first media is accepted by the receiving-side user, and the second media is unsupported and thus automatically rejected by the IWF.

In step **1315**, a session for the accepted first media is initiated between the CPM server **120** and the first IWEF **141**. In step **1317**, the CPM server **120** creates a new session initiation request for the rejected second media, and then in step **1317**, sends the created request to the ISF **130**. In step **1315**, the first media session may be initiated after step **1317**, depending on the operation scheme of the CPM server **120**.

In step **1321**, the CPM server **120** sends "200 OK", as a response message to the session initiation request received in step **1301**, to the CPM client **110**. The response message may include a simple indication that the first media is accepted, and the second media is rejected. The actual point in time when the response message is delivered to the CPM client **110** in step **1321** may vary according to the operation scheme of the CPM server **120**. In other words, the CPM server **120** may wait for a certain period of time to receive a response message to the new session initiation request sent in step **1319**, or may send the response message to the CPM client **110** as soon as receiving the first response message from the ISF **130**. FIG. **13** assumes the latter. In the case of the former, when response messages to the new session initiation request are received during a fixed period of time, the CPM server **120** integrates these response messages, and then sends the final response message to the CPM client **110**, as in the operation of FIG. **3**. If response messages to the new session initiation request are received beyond the fixed period of time, then the CPM server **120**, first of all, sends the response message received first to the CPM client **110** to initiate a session for the accepted media, and then modifies or maintains the initiated session according to the contents of the subsequent response messages to the new session initiation request.

In step **1323**, the first media session is initiated between the CPM client **110** and the CPM server **120**.

In step **1325**, the ISF **130** selects an IWF that is most suitable to perform the received new session initiation request, and sends the session initiation request to the selected IWF. In FIG. **13**, it is assumed that the ISF **130** selects the second IWF **412**. In step **1327**, the ISF **130** sends the session initiation request message to the second IWF **142**. In step **1329**, the second IWF **142** generates and sends back "200

OK" as a response message to the session initiation request because it supports the second media. In step **1331**, the ISF **130** delivers the received response message to the CPM server **120**.

In step **1333**, the second media session is initiated between the CPM server **120** and the second IWF **142**.

In step **1335**, the CPM server **120** sends a session modification request to the CPM client **110**. The session modification request is a request to add the second media session to the first media session initiated between the CPM client **110** and the CPM server **120**.

In step **1337**, the CPM client **110** sends "200 OK", as an acceptance response message to the session modification request, to the CPM server **120**. In step **1339**, the session initiated between the CPM client **110** and the CPM server **120** is modified in such a manner as to include both the first and second media.

FIG. **4** illustrates an operation of an IWF in the proxy mode according to the first embodiment of the present invention. In this operation, the IWF performs an operation for sending back a response message to a session initiation request.

In step **401**, the IWF check if the session initiation request is rejected, and proceeds to step **403** when the session initiation request is rejected. In step **403**, since the session initiation request is rejected, the IWF generates a rejection response message, and sends the generated rejection response message back to the ISF. The response message sent back is sent to the CPM server via the IWF. The IWF generates the rejection response message defined in [RFC(Request for Comments) **3261**] according to a reason for rejection. If the session initiation request is accepted (i.e. not rejected) in step **401**, then the IWF proceeds to step **405**. In step **405**, the IWF checks if the session is accepted for all or some of the requested media. When the session is accepted for only some of the requested media, the IWF proceeds to step **407**.

In step **407**, the IWF generates an acceptance response message (200 OK), and then sends the generated acceptance response message back to the ISF. With regard to this, the IWF includes information, which clarifies whether the rejected media types are rejected by the IWF or the receiving client, in the response message. A way to express such information in the response message will be described below.

When the session is accepted for all of the requested media in step **405**, the IWF proceeds to step **409**, and generates an acceptance response message (200 OK) to then send the generated acceptance response message back to the ISF.

When some of the requested media are rejected in step **407**, the IWF includes a reason for rejection in the response message. In the present invention, a reason for rejection of a session initiation request for media is divided into two categories. The first category corresponds to the case where the request is rejected by notification given from the receiving client, and the second category corresponds to the case where the IWF rejects unsupported media. In the present invention, the IWF includes a reason for the rejection of media in the response message, thereby making it possible to retry to initiate a session for the rejected media type.

As a way to include in a response message information on why or by whom the session initiation for media is rejected, three cases are proposed in the present invention.

Case 1 is described in Table 1.

TABLE 1

```
SIP/2.0 200 OK
From: <sip:cpm_user@example1.com>;tag=a6c85cf
To: <sip:non-cpm-user@example2.com>;tag=1928301774
CSeq: 314159 INVITE
Call-ID: a84b4c76e66710
Contact: <sip:interworking_function@example2.com>
- omitted
Content-Type: application/sdp
Content-Disposition: session
//SDP ANSWER//
v=0
o=-1357924 1357924 IN IP6 5555::1:2:3:4
s=-
c=IN IP6 5555::1:2:3:4
t=0 0
m=audio 3458 RTP/AVP 97 98
a=rtpmap:97 AMR-WB
a=rtpmap:98 telephone-event
- omitted
m=video 0 RTP/AVP 98 99
a=rejected-by:network
```

In Case 1, "rejected by" SDP Attribute is defined to express information on why or by whom the session initiation for media is rejected. The "rejected-by" denoting the attribute of a media level has the identification value of a rejecter who rejects the session initiation for a corresponding media type. In the present invention, "user" or "network" is illustrated as the attribute value. In the actual implementation, the attribute value may be changed to or replaced by another value. The attribute value "user" represents the case where a receiving client rejects a session initiation request for media, and the attribute value "network" represents the case where an IWF or a non-CPM server of a receiving client rejects a session initiation request for media because it cannot support the corresponding media.

It can be noted from Table 1 that video is rejected on any account because the port number in the media line of video (m=video 0 RTP/AVP 98 99) is set to 0. From the fact that the attribute value "rejected-by" is set to "network", it can also be noted that the requested media type is unsupported by an IWF, and thus the IWF rejects the session request.

In addition to the session initiation request, the above operation of clarifying information on why or by whom a media type is rejected may be performed by an IWF in the same manner for a request for adding new media to an already initiated session.

Case 2 is described in Table 2.

TABLE 2

```
SIP/2.0 200 OK
From: <sip:cpm_user@example1.com>;tag=a6c85cf
To: <sip:non-cpm-user@example2.com>;tag=1928301774
CSeq: 314159 INVITE
Call-ID: a84b4c76e66710
Contact: <sip:interworking_function@example2.com>audio;video
- omitted
Content-Type: application/sdp
Content-Disposition: session
v=0
o=-1357924 1357924 IN IP6 5555::1:2:3:4
s=-
c=IN IP6 5555::1:2:3:4
t=0 0
m=audio 3458 RTP/AVP 97 98
a=rtpmap:97 AMR-WB
a=rtpmap:98 telephone-event
- omitted
m=video 0 RTP/AVP 98 99
```

In Case 2, an IWF expresses its supported media types in a response message. To this end, the IWF includes feature tags of its supported media, among [RFC 3840] media feature

tags, in a response message. In Table 2, since the IWF supports audio and video media, it includes audio and video tags in the "Contact" header.

When a response message generated according to Case 2 includes media tags corresponding to media types for which session initiation is rejected, the corresponding media are considered as rejected by a receiving client. However, when a response message does not include media tags corresponding to rejected media types, the corresponding media are considered as rejected by an IWF.

Case 3 is described in Table 3.

TABLE 3

```
SIP/2.0 200 OK
From: <sip:cpm_user@example1.com>;tag=a6c85cf
To: <sip:non-cpm-user@example2.com>;tag=1928301774
CSeq: 314159 INVITE
Call-ID: a84b4c76e66710
Contact: <sip:interworking_function@example2.com>
Content-Type: multipart/mixed; boundary="abcd"
- omitted
//SDP ANSWER//
--abcd
Content-Type: application/sdp
Content-Disposition: session
v=0
o=-1357924 1357924 IN IP65555::1:2:3:4
s=-
c=IN IP6 5555::1:2:3:4
t=0 0
m=audio 3458 RTP/AVP 97 98
a=rtpmap:97 AMR-WB
a=rtpmap:98 telephone-event
- omitted
m=video 0 RTP/AVP 98 99
--abcd
//SDP CAPABILITY//
Content-Type: application/sdp
Content-Disposition: capability
v=0
o=carol 28908764872 28908764872 IN IP4 100.3.6.6
s=-
t=0 0
c=IN IP4 192.0.2.4
m=audio 0 RTP/AVP 0 1 3
a=rtpmap:0 PCMU/8000
a=rtpmap:1 1016/8000
a=rtpmap:3 GSM/8000
m=video 0 RTP/AVP 31 34
a=rtpmap:31 H261/90000
a=rtpmap:34 H263/90000
--abcd--
```

In Case 3, an IWF includes supported media information as an SDP parameter in a response message. A method of delivering SIP UA capability information by using an SDP parameter is defined in [RFC 3264]. Since an IWF delivers information on its supported media types by using an SDP parameter, a response message includes two SDP bodies.

One of the SDP modes is an SDP body (SDP Answer) for expressing acceptance or rejection of a session initiation request, and the other is an SDP body including information on media supported by an IWF. In order to discern the latter from the former, "capability" is defined as the "Content-Disposition" header value of the latter in the present invention. The "capability" indicates that a corresponding SDP body expresses not an SDP Answer, but capability information of an SIP UA.

In Table 3, the SDP body part, the "Content-Disposition" header value of which is set to "capability", expresses the capability of an IWF. In Table 3, the SDP body corresponding to the capability of an IWF represents the fact that video and audio media are supported by the IWF, codec information supportable for each media, and the like.

When media types supported by an IWF are rejected in a response message generated according to Case 3, the media types are considered as rejected by a receiving client. However, when media types unsupported by an IWF are rejected, the media types are considered as rejected by the IWF.

FIG. **5** illustrates an operation of a CPM server when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to the first embodiment of the present invention, as described in FIG. **3**.

According to the conventional technology, on receiving a session initiation request message from a CPM client, a CPM server determines if interworking needs to be performed, and then sends the session initiation request message to an ISF when interworking needs to be performed. That is, the CPM server sends the session initiation request message to the address of a receiving client when interworking is not needed, and sends the session initiation request message to a corresponding IWF via an ISF when interworking is needed.

In the first embodiment of the present invention, the CMP server operates in the same manner as in the conventional technology in order to process a session initiation request message. However, the CPM server operates in a different manner as in the conventional technology in that it receives a response message to the session initiation request message from an ISF. That is, when there are media that are rejected by an IWF from among media for which session initiation is requested, the CPM server retries to initiate a session for the rejected media according to details of the rejection, included in a response message.

In step **501**, the CPM server receives a response message to the session initiation request message from the ISF. In step **503**, when the response message is an acceptance response message (200 OK), the CPM server proceeds to step **505**, and initiates a session including the accepted media with the ISF. In step **507**, CMP determines if there are media types that are rejected due to the attribute of an IWF, that is, media types unsupported by an IWF, from among media types for which session initiation is requested. The CPM sever proceeds to step **511** when there are rejected media types, and proceeds to step **509** when there are no rejected media types.

The case where there are no media types that are rejected due to the attribute of an IWF corresponds to the case where all the requested media types are accepted, or the case where some media types are rejected by a receiving client. Thus, in step **509**, the CPM server generates a response message to the session initiation request message, and sends the generated response message back to the CPM client having sent the session initiation request message.

In step **511**, the CPM server regenerates the session initiation request message (INVITE) for the media types rejected due to the attribute of an IWF. In step **513**, the CPM server sends the regenerated session initiation request message to the ISF, and returns to step **501**, in which the CPM server again receives a response message to the session initiation request message from the ISF.

If the session initiation request is not accepted in step **503**, then the CPM server proceeds to step **515**, and checks if the session initiation request is rejected by the receiving client. The CPM server proceeds to step **509** when the session initiation request is rejected by the receiving client, and proceeds to step **517** when the session initiation request is not rejected by the receiving client.

In step **517**, the CPM server discovers a reason for rejection of the session initiation request through a predefined code number, thereby checking if the session initiation request may be retried. Whether the session initiation request may be retried is determined in consideration of the reason for the

rejection of the session initiation request. Also, the CPM server may consider whether retrying the session initiation request is allowed pursuant to the service policy, whether a limited number of retrials is exceeded, and so forth. If retrying the session initiation request is allowed, then the CPM server proceeds to step **513**, and resends the session initiation request message for the rejected media to the ISF. However, if retrying the session initiation request is not allowed, then the CPM server proceeds to step **509**, and sends a response message back to the CPM client.

After a session is initiated between the CPM client and the CPM server through interworking, the session must be modified at the request of the CPM client. Hereinafter, an operation of modifying an already initiated session according to embodiments of the present invention will be described.

Session modification includes (1) adding new media to an already initiated session, which will be described as a second embodiment of the present invention in FIG. **6**; (2) deleting media included in an already initiated session, which will be described as a third embodiment of the present invention in FIG. **7**; and (3) changing media types of an already initiated session, that is, deleting existing media and simultaneously adding new media, which will be described as a fourth embodiment of the present invention in FIG. **8**.

A CPM client requests a CPM server to modify a session by sending a session modification request message to the CPM server. According to the above three scenarios, the session modification request message may be format-converted into a media addition request message in case (1), may be format-converted into a media deletion request message in case (2), and may be format-converted into a media change request message in case (3).

FIGS. **6**A and **6**B illustrate an operation of adding a new media type to an already initiated session when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to a second embodiment of the present invention. The operation in FIG. **6** assumes the following conditions:

(1) A session including first and second media is initiated between a CPM client and a CPM server.

(2) In order to send/receive the first media to/from a receiving client, the CPM server has initiated a session including the first media with a first IWF.

(3) In order to send/receive the second media to/from the receiving client, the CPM server has initiated a session including the second media with a second IWF.

(4) The first and second IWFs do not support third media. Also, the first IWF supports fourth media.

(5) A third IWF supports the third media, and performs interworking with a third non-CPM service.

(6) The receiving client subscribes to the third non-CPM service supporting the third media.

In step **601**, the CPM client **110** sends a media addition request message for adding the third and fourth media to the (first media+second media) session initiated between the CPM client **110** and the CPM server **120**. The media addition request message includes SDP parameters for the first, second, third, and forth media.

In step **603**, media sessions connected to the (first media+second media) session initiated between the CPM client **110** and the CPM server **120** are the first media session initiated between the CPM server **120** and the first IWF **141** and the second media session initiated between the CPM server **120** and the second IWF **412**.

In step **603**, the CPM server **120** selects one of the first media session and the second media session. In step **603**, it is assumed that the CPM server **120** selects the first media session. In step **605**, the CPM server **120** sends a media addition request message (Re-INVITE) to the first IWF **141** to which the first media session is connected. The media addition request message includes SDP parameters for the first, third, and fourth media.

In step **607**, the first IWF **141** accepts the first and fourth media included in the media addition request message, but rejects the third media because the first IWF **141** cannot support the third media. Thus, the first IWF **141** sends a response message (200 OK) including such details back to the CPM server **120**. With regard to this, the details of the response message includes information indicating that the third media is rejected due to the attribute of the first IWF **141**. In step **609**, the session initiated between the CPM server **120** and the first IWF **141** is modified in such a manner as to include the first and fourth media.

In step **611**, the CPM server **120** retries a media addition request for the third media rejected due to the attribute of the first **141**. That is, the CPM server **120** tries to add the third media to the second session to which any media addition request is not tried yet. To this end, the CPM server **120** generates a media addition request message (Re-INVITE) for adding the third media to the second session, and sends the generated media addition request message to the second IWF **142** in step **613**. The media addition request message includes SDP parameters for the second and third media.

In step **615**, the second IWF **142** accepts the second media included in the media addition request message because the second media is included in the existing session, but rejects the third media because it cannot support the third media. Thus, in step **617**, the second IWF **142** generates and sends back a response message (200 OK) including such details. With regard to this, the details of the response message includes information indicating that the third media is rejected due to the attribute of the second IWF **142**.

In step **617**, since there is no session to which the third media rejected by the first and second IWFs **141**, **142** may be added, the CPM server **120** generates a session initiation request message for the third media, and determines in step **619** if interworking is needed for the generated session initiation request message. Assuming that interworking is needed, the CPM server **120** sends the session initiation request message to the ISF **130** in step **621**.

In step **623**, the ISF **130** selects an IWF that is most suitable to process the session initiation request message. Assuming that the third IWF **413** is selected, the ISF **130** sends the session initiation request message to the third IWF **413** in step **625**, and the third IWF **413** generates and sends back an acceptance response message in step **627**. In step **629**, the ISF **130** delivers the response message to the CPM server **120**. In step **631**, a session including the third media is initiated between the CPM server **120** and the third IWF **143**. In step **633**, the CPM server **120** generates a response message to the media addition request message, and then sends the generated response message back to the CPM client **110**. In step **635**, the existing session initiated between the CPM client **110** and the CPM server **120** is modified in such a manner as to include the first, second, third, and fourth media.

In FIG. **6**, the ISF **130** and the first to third IWFs **141**, **142**, **143** may be implemented as a single interworking unit. Such a single interworking unit includes a controller (not shown in the drawing). In the case of this device configuration, the ISF **130** can receive a media addition request message for adding the third and fourth media from the CPM server **120**, and select an IWF for controlling interworking of the requested third and fourth media. If the ISF **130** selects the first IWF **141**, then it sends a media addition request message to the first

IWF **141**. As mentioned above, the first IWF **141** cannot support the third media. Thus, the first IWF **141** delivers details, indicating that the third media is rejected due to the attribute of the first IWF **141**, to the controller (not shown). Based on this reason for the rejection, the controller instructs the ISF **130** to reselect an IWF for the third media, and the ISF **130** may reselect an IWF according to the controller's instruction. As another example, the controller may be so designed as to reselect an IWF, based on a reason for the rejection.

In the above operation, the CPM server **120** repeats to send a media addition request message to any one IWF, even when the CPM server **120** initiates media sessions with a plurality of IWFs in step **603**. However, depending on the operation scheme of the CPM server **120**, the CPM server **120** may simultaneously send a media addition request message to the respective IWFs, each of which initiates a media session with the CPM server **120**. However, this may cause the case where an addition request for the same media is accepted by different IWFs at the same time, the CPM server **120** must prevent the same media from being added to different IWFs at the same time by checking all received response messages.

Therefore, as a way to prevent overlapping addition of the same media, the CPM server **120** may wait until response messages are received from all IWFs to which a media addition request is sent, so as to prevent the same media from being added to different IWFs at the same time. Alternatively, the CPM server **120** may prevent overlapping addition of the same media by processing an OK response message received first from one IWF, generating a session termination request message (BYE) or a media deletion request message (Re-INVITE) when overlapping addition of the same media is caused by an OK response message received later on from another IWF, and then sending the generated message to the corresponding IWF.

FIG. **15** illustrates an operation of adding a new media type to an already initiated session when an ISF operates in the proxy mode where a message body part is not allowed to be modified according to the second embodiment of the present invention. The operation of FIG. **15** is different from that of FIG. **6** in that the CPM server tries to simultaneously send a media addition request to all relevant IWFs.

The operation of FIG. **15** assumes the same conditions as in FIG. **6**, except the following conditions:

(1) The first IWF and the second IWF do not support the third media.

(2) The first IWF and the second IWF support the fourth media.

In step **1501**, the CPM client **110** sends a media addition request message for adding the third and fourth media to the (first media+second media) session initiated between the CPM client **110** and the CPM server **120**. The media addition request message includes SDP parameters for the first, second, third, and forth media.

In step **1503**, media sessions connected to the (first media+second media) session initiated between the CPM client **110** and the CPM server **120** are the first media session initiated between the CPM server **120** and the first IWF **141** and the second media session initiated between the CPM server **120** and the second IWF **412**.

In step **1503**, the CPM server **120** sends a media addition request message (Re-INVITE) to the first IWF **141** to which the first media session is connected. The media addition request message includes SDP parameters for the first, third, and fourth media.

In step **1505**, the CPM server **120** sends a media addition request message (Re-INVITE) to the second IWF **142** to which the second media session is connected. The media addition request message includes SDP parameters for the second, third, and fourth media.

In step **1507**, the first IWF **141** accepts the first and fourth media included in the media addition request message, but rejects the third media because the IWF **141** cannot support the third media. Thus, the first IWF **141** sends a response message (200 OK) including such details back to the CPM server **120**. With regard to this, the details of the response message includes information indicating that the third media is rejected due to the attribute of the first IWF **141**. In step **1509**, the session initiated between the CPM server **120** and the first IWF **141** is modified in such a manner as to include the first and fourth media.

In step **1511**, the second IWF **142** accepts the second and fourth media included in the media addition request message, but rejects the third media because it cannot support the third media. Thus, in step **1513**, the second IWF **142** generates and sends back a response message (200 OK) including such details. With regard to this, the details of the response message includes information indicating that the third media is rejected due to the attribute of the second IWF **142**. In step **1513**, the session initiated between the CPM server **120** and the second IWF **142** is modified in such a manner as to include the first and fourth media.

As a result of performing the above steps, the third media is added to the first IWF **141** and the second IWF **142** at the same time. Thus, in order to prevent overlapping addition of the third media, the CPM server **120** generates a media deletion request message (Re-INVITE) for deleting the third media added later on, and sends the generated media deletion request message to the second IWF **142**.

In step **1517**, the second IWF **142** sends an acceptance response message to the CPM server **120** in response to the media deletion request message. In step **1519**, the session initiated between the CPM server **120** and the second IWF **142** is modified such that the third media is deleted from the session, and only the second media is included in the session.

A description of subsequent steps will be omitted because they have been already described in FIG. **6**.

However, the operation of the CPM server **120**, as described in FIG. **15**, may vary somewhat according to the implementation of the CPM server **120**. For example, the CPM server **120** receives response messages from the first IWF **141** and the second IWF **142** in FIG. **15**, but the CPM server **120** may send an SIP UPDATE message or an SIP CANCEL message according to the implementation scheme or settings of the server, so long as it has received an OK response message from the first IWF **141**, but has not yet received a response message from the second IWF **142**.

The SIP CANCEL message is sent when all media to be added are accepted by the first IWF **141**, and is intended to cancel the media addition request message sent to the second IWF **142**.

The SIP UPDATE message may be used when only some of media requested to be added to the first IWF **141** are accepted while the others are rejected, and is intended to delete the media accepted by the first IWF **141** from the media addition request message sent to the second IWF **142**.

FIG. **7** illustrates an operation of modifying an already initiated session by deleting a specific media type when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to a third embodiment of the present invention. The situation envisioned in FIG. **7** supposes that the third and fourth media added through the operation of FIG. **6** are again deleted.

In step **701**, the CPM client **110** sends a media deletion request message for deleting the third and fourth media from the session initiated between the CPM client **110** and the CPM server **120** to the CPM server **120**. The media deletion request message includes SDP parameters for the first and second media.

In step **703**, the CPM server **120** selects a target session for the media deletion request. That is, the CPM server **120** selects the third session initiated between the CPM server **120** and the third IWF **143** in order to delete the third media, and selects the (first media+fourth media) session initiated between the CPM server **120** and the first IWF **141** in order to delete the fourth media.

In step **705**, the CPM server **120** generates a media deletion request message for deleting the fourth media from the selected (first media+fourth media) session, and then sends the generated media deletion request message to the first IWF **141**. In step **707**, the CPM server **120** is to generate a media deletion request message, which requests the selected third media session to delete the third media. However, since the third media session does not include media other than the third media, the CPM server **120** generates a session termination message (BYE), and then sends the session termination message to the third IWF **143**.

In step **709**, the first IWF **141** generates an acceptance response message to the fourth media deletion request message, and then sends the acceptance response message back to the CPM server **120**. In step **711**, the fourth media is deleted from the (first media+fourth media) session initiated between the CPM server **120** and the first IWF **141**. In step **713**, the third IWF **143** generates an acceptance response message to the session termination request received in step **707**, and then sends the acceptance response message back to the CPM server **120**. In step **715**, the third media session initiated between the CPM server **120** and the third IWF **143** is terminated.

In step **717**, the CPM server **120** generated a response message to the media deletion request received in step **7021**, and then sends the response message to the CPM client **110**. In step **719**, the third and fourth media are deleted from the (first media+second media+third media+fourth media) session initiated between the CPM client **110** and the CPM server **120**.

FIGS. **8**A and **8**B illustrate an operation of modifying an already initiated session by adding new media to the session and simultaneously deleting existing media from the session when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to a fourth embodiment of the present invention. That is, the operation of FIG. **8** corresponds to an operation of changing a specific media type, and the situation envisioned in FIG. **8** supposes that the third and fourth media are added to the session initiated through the operation of FIG. **3**, and the second media is deleted from the session.

In step **801**, the CPM client **110** sends a media modification request message for adding the third and fourth media to and deleting the second media from the session initiated between the CPM client **110** and the CPM server **120** to the CPM server **120**. The media modification request message includes SDP parameters for the first, third, and fourth media.

In step **803**, the CPM server **120** selects a target session for the media deletion request. That is, the CPM server **120** selects the second session initiated between the CPM server **120** and the second IWF **142** in order to delete the second media. In step **805**, the CPM server generates a session modification request message for adding the third and fourth media to and deleting the second media from the selected second media session, and sends the session modification request message to the second IWF **142**. The session modification message includes SDP parameters for the third and fourth media.

In step **807**, the second IWF **142** sends back a rejection response message because the second IWF **142** cannot support the third and fourth media. In step **809**, the CPM server **120** may generate the second media deletion request message again, and send the second media deletion request message to the second IWF **142**. However, since the second media session does not include media other than the second media to be deleted, the CPM server **120** sends a session termination request message (BYE), instead of the media deletion request message, to the second IWF **142**. In step **811**, the second IWF **142** sends back an acceptance response message to the session termination request message. In step **813**, the second media session initiated between the CPM server **120** and the second IWF **142** is terminated.

In step **815**, since adding the third and fourth media to the second session is rejected due to the attribute of the second IWF **142**, the CPM server **120** generates a media addition request message for adding the third and fourth media to the first media session to which the media addition request is not sent yet, and then in step **817**, sends the generated media addition request message to the first IWF **141**. The media addition request message includes SDP parameters for first, third, and fourth media.

In step **819**, since the first IWF **141** supports the first and fourth media, but does not support the third media, the first IWF **141** accepts the first and fourth media, but rejects the third media. Thus, the first IWF **141** sends back a response message including such details. That is, the response message includes information indicating that the third media is rejected due to the attribute of the first IWF **141**. Since the first and fourth media are accepted, in step **821**, the first media session is modified in such a manner as to include first and fourth media.

In step **823**, the CPM server **120** retries the addition request for the third media that has been rejected due to the attribute of the first or second IWF **141**, **142**. However, since the CPM server **120** has requested media addition to the already initiated sessions, the CPM server **120** generates a session initiation request message for the third media, instead of a media addition request message. Subsequently, in step **825**, the CPM server **120** determines if interworking is needed for the generated session initiation request message. In FIG. **8**, it is assumed that interworking is needed.

In step **827**, the CPM server **120** sends the session initiation request message for the third media to the ISF **130**. In step **829**, the ISF **130** selects an IWF that is most suitable for session initiation. It is assumed here that the third IWF **143** is selected. In step **831**, the ISF **130** sends a session initiation request message to the third IWF **143**. In step **833**, the third IWF **143** generates an acceptance response message to the session initiation request, and sends the acceptance response message back to the ISF **130**. In step **835**, the ISF **130** delivers the response message to the CPM server **120**, and then in step **837**, the third media session is initiated between the CPM server **120** and the third IWF **143**.

In step **839**, the CPM server **120** generates a response message to the session modification request message (message for adding the third and fourth media, and deleting the second media) received in step **801**, and then sends the response message back to the CPM client **110**. The response message includes details indicating that all the CPM client **110** requested is accepted. In step **841**, the session between

the CPM client **110** and the CPM server **120** is modified in such a manner as to include the first, third, and fourth media.

Reference will now be made to how the CPM server operates in the second to fourth embodiments of the present invention. The operation illustrated in FIG. **9** corresponds to the case where the CPM server receives a session modification request message from the CPM client, and the operation illustrated in FIGS. **10**A and **10**B corresponds to the case where the CPM server receives a response message to a session modification request from an IWF.

FIG. **9** illustrates an operation of a CPM server that receives a session modification request message when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to the second to fourth embodiments of the present invention.

In step **901**, the CPM server receives a session modification message (Re-INVITE) from the CPM client. The session modification request message includes information indicating that a session to be modified is the session initiated between the CPM server and the CPM client. In step **903**, the CPM server selects a target media session for the session modification request from among sessions mapped to a receiving client. When there are several target media sessions for the session modification request, the CPM server immediately selects the several media sessions. For example, if the session modification request is a request for deleting media of several media types or changing a media type, and all the requested media are not included in one media session, then media sessions each including the requested media may be all selected.

When the CPM server selects the media session, it may operate as follows:

If the session modification request from the CPM client is a media addition request, then the CPM server may store details included in a response message, which has been sent back from an IWF at session initiation, and then utilize the details. That is, when a response message from an IWF includes information on media types supported by the corresponding IWF, as shown in Table 2 or 3, the CPM server may store information on the corresponding media types, and then utilize the information to check if the media requested in the media addition request message are supported to the corresponding IWF, and to select a target media session to which to add the requested media. If the session modification request is a media deletion request for specific media or a request for changing specific media to other media, then the CPM server can immediately select the media session because it knows which media is included in the current media session.

In step **905**, the CPM server generates a session modification request message adapted to the selected media session, and sends the session modification request message to an IWF participating in the corresponding media session. When several media sessions are selected as a media session to be modified, the CPM server generates session modification request messages for the several media sessions, and sends the session modification request messages to the corresponding IWFs.

If the session modification request is a media deletion request, and the selected media session includes media other than the requested media, then the CPM server generates a media deletion request message (Re-INVITE), and sends the media deletion request message to the corresponding IWF. However, if the selected media session does not include media other than the requested media, then the CPM server generates a session termination request message (BYE) for the selected media session, and sends the session termination request message to the corresponding IWF.

FIG. **10** illustrates an operation of a CPM server that receives a response message from an IWF when an ISF operates in the proxy mode where a message body part is not permitted to be modified according to the second to fourth embodiments of the present invention. FIG. **10** assumes that a media addition request included in a session modification request message may be rejected by a receiving client or due to the attribute of the IWF, but a media deletion request and a media type change request may be rejected only by a receiving client.

In step **1001**, the CPM server **120** receives a response message to a session modification request from the ISF **130**. In step **1003**, when the response message is a response to a session modification request including a media addition request, the CPM server **120** proceeds to step **1005**. The session modification request including a media addition request refers to a request for only adding new media or a request for changing media types. In step **1005**, when the response message is an acceptance response message (200 OK), the CPM server **120** proceeds to step **1007**, and modifies the corresponding session such that the requested media is added thereto. However, when the response message is not an acceptance response message, the CPM server **120** proceeds to step **1025**.

In step **1009**, if media is rejected due to the attribute of the IWF among the requested media, then the CPM server proceeds to step **1011**. Otherwise, the CPM server **120** proceeds to step **1023**, and generates a response message to the session modification request from the CPM client, and sends the response message back to the CPM client.

In step **1011**, if there are media sessions to which the media session modification request is not yet sent among media sessions connected to the CPM server **120**, then the CPM server **120** proceeds to step **1013**. In step **1013**, the CPM server selects any one of the media sessions to which the media session modification request is not yet sent, and generates a media addition request message for the rejected media, adapted to the selected media session. In step **1015**, the CPM server sends the generated media addition request message to the selected IWF. Subsequently, the CPM server returns to step **1001** in order to process a response message to the sent media addition request message.

In step **1011**, if there are no media sessions to which the media session modification request is not yet sent, then the CPM server proceeds to step **1029**. In step **1029**, the CPM server **120** generates a session initiation request message (INVITE) for the media rejected due to the attribute of the IWF. In step **1031**, the CPM server determines if interworking is needed for the generated session initiation request message. When interworking is needed, the CPM server proceeds to step **1033**, and sends the session initiation request message to the ISF **130**. When interworking is not needed, the CPM server proceeds to step **1035**.

Since no need for interworking means that the receiving client is a CPM client, the CPM server sends the session initiation request message to the address of the receiving client. When the receiving client is located in the same network area as the CPM server **120**, the session initiation request message is sent to the receiving CPM client **110**. However, when the receiving client is located in a different network area, the session initiation request message is sent to the CPM server **120** belonging to the corresponding network area. Subsequently, if the CPM server **120** receives a response message to the session initiation request, then the CPM server **120** returns to step **1001** in order to process the response message.

In step **1003**, when the received response message is not a response message to a session modification request including a media addition request, that is, when the received response message is a response message to a media deletion request, the CPM server proceeds to step **1017**. In step **1017**, when the received response message is an acceptance response message (200 OK), that is, when the session modification request is accepted, the CPM server proceeds to step **1019**, and modifies the target media session such that the accepted details, that is, the media deletion, is reflected in the target media session. However, when the received response message is a rejection response message, the CPM server proceeds to step **1021**, and maintains the existing session. In step **1023**, the CPM server generates a response message to the session modification request from the CPM client **110**, and sends the response message back to the CPM client **110**.

In step **1005**, when the received response message is a rejection response message, the CPM server proceeds to step **1025**. In step **1025**, since retrying the session modification request is not needed if the rejection response is not due to the attribute of the IWF, the CPM server proceeds to step **1021**, and maintains the existing session. If the rejection response is due to the attribute of the IWF, then the CPM server proceeds to step **1026**. In step **1026**, the CPM server determines if the rejection response is a rejection response to a media addition request or a media type change request. In the case of a rejection response to a media addition request, the CPM server proceeds to step **1011**, and creates a media addition request message or a media initiation request message.

However, when the rejection response is a rejection response to a media type change request, steps **1011** and **1027** are performed at the same time. That is, the media type change request is a request for adding new media and deleting previous media. However, since the new media for the addition request are not supported by the IWF, the CPM server **120** must separately make a media addition request and a media deletion request. Thus, in step **1027**, the CPM server generates a media deletion request message, and resends it to the corresponding IWF. At the same time, the CPM server **120** proceeds to step **1011** and subsequent steps, and processes the media addition request.

B. Case where a Message Body Part is Permitted to be Modified

An IWF operating in the proxy mode where a message body part is permitted to be modified operates in substantially the same manner as an ISF operating in the B2BUA mode. However, the process is different in that while an ISF operating in the B2BUA mode sets the destination address and port of media to those of an IWF in the SDP body of a message before delivering the message, an ISF operating in the B2BUA mode sends an SDP body received from a CPM server in its entirety because the CPM server cannot modify the message body. A procedure of initiating and modifying a session when an ISF operates in the B2BUA mode will be described below.

ISF: B2BUA Mode

When an IWF operates in the proxy mode, one session including all media requested by a CPM client is initiated between the CPM client and a CPM server, and several media sessions may be initiated between the CPM server and the IWF according to media types supported by the IWF. Therefore, one session diverges into several media sessions at the CPM server.

When the IWF operates in the B2BUA mode, one session including all media requested by a CPM client is initiated between the CPM client and the CPM server, as well as between the CPM server and an ISF. However, several media sessions may be initiated between the ISF and the IWF according to media types supported by the IWF. Therefore, dissimilar to the proxy mode, one session diverges into several media sessions at the ISF.

Each entity in the B2BUA mode operates as follows:

On receiving a session initiation or modification request message, the CPM server determines if interworking is needed, and then sends the session initiation or modification request message to the ISF when interworking is needed. Also, on receiving a response message to the session initiation or modification request message from the ISF, the CPM server delivers the response message to the CPM client.

The IWF operates in the same manner as in the proxy mode, and the ISF operates in substantially the same manner as the CPM server in the proxy mode.

FIGS. **11**A and **11**B illustrate the operation of initiating a session when an ISF operates in the B2BUA mode according to a fifth embodiment of the present invention.

In step **1101**, the CPM client **110** sends a session initiation request message (INVITE) including the first and second media to the CPM server **120**. In step **1103**, the CPM server **120** determines if interworking is needed for the session initiation. Since it is assumed that the receiving client is a non-CPM client, interworking is needed. Thus, in step **1105**, the CPM server **120** sends the session initiation request message to the ISF **130**.

In step **1107**, the ISF **130** selects an IWF suitable for the session initiation. FIGS. **11**A and **11**B assume that the first IWF **141** supporting the first media is selected. Thus, in step **1109**, the ISF **130** sends a session initiation request message to the first IWF **141**. In step **1111**, the first IWF **141** sends back an acceptance response message (200 OK) to the session initiation request. Since the first IWF **141** supports the first media, but does not support the second media, the acceptance response message includes details indicating that the second media is rejected due to the attribute of the first IWF **141**, that is, the second media is a specific unsupported by the first IWF **141**. In step **1113**, a media session including the first media is initiated between the ISF **130** and the first IWF **141**.

In step **1115**, the ISF **130** checks if retrying the session initiation for the rejected second media is allowed. It is assumed here that retrying the session initiation is allowed. Thus, in step **1117**, the ISF **130** generates a session initiation request message for the rejected second media. In step **1119**, the ISF **130** selects the second IWF **142** as an IWF to which to send the session initiation request message, and then in step **1121**, sends the session initiation request message to the selected second IWF **142**.

In step **1123**, the second IWF **142** sends back an acceptance response message (200 OK). In step **1125**, a media session including the second media is then initiated between the ISF **130** and the second IWF **142**. In step **1127**, the ISF **130** generates a response message to the session initiation request received in step **1105**, and sends the response message back to the CPM server **120**. The response message includes details indicating that both the first and second media are all accepted. In step **1129**, a session including the first and second media is initiated between the CPM server **120** and the ISF **130**. In step **1131**, the CPM server **120** generates a response message to the session initiation request received in step **1131**, and sends the response message back to the CPM client **110**. The response message includes details indicating that both the first and second media are all accepted. In step **1133**, a session including the first and second media is initiated between the CPM client **110** and the CPM server **120**.

FIGS. **14**A and **14**B illustrate another operation of initiating a session when an ISF operates in the B2BUA mode

according to the fifth embodiment of the present invention. In FIG. **4**, the ISF **130** receives all response messages from the respective IWFs, combines them into a single response message, delivers the single response message to the CPM server **120**, and then finally initiates a session. To the contrary, in FIGS. **14**A and **14**B, the ISF **130** first initiates a session with the CPM server **120**, based on a response message received from an IWF (a first IWF) that primarily performs interworking. Subsequently, when an acceptance response message is received from an IWF (a second IWF) that secondarily performs interworking, the ISF **130** adds media additionally accepted by the second IWF to the sessions already initiated between the ISF **130** and the CPM server **120**, and between the CPM server **120** and the CPM client **110**. Therefore, except for these features, the remaining steps in FIG. **14** are the same as those in FIG. **4**.

In step **1401**, the CPM client **110** sends a session initiation request message (INVITE) including the first and second media to the CPM server **120**. In step **1403**, the CPM server **120** determines if interworking is needed for the session initiation. Since it is assumed that the receiving client is a non-CPM client, interworking is needed. Thus, in step **1405**, the CPM server **120** sends the session initiation request message to the ISF **130**.

In step **1407**, the ISF **130** selects an IWF that is most suitable to perform the session initiation, based on information including the preference and presence of the receiving client, the media type for which the session initiation request is made, the service to which the receiving client subscribes, the service policy, etc. It is assumed that the ISF **130** selects the first IWF **141** in step **1407**.

In step **1409**, the ISF **130** sends the session initiation request message to the first IWF **141**. In step **1411**, the first IWF **141** generates and sends back "200 OK" as an acceptance response message to the session initiation request because it supports the first media. In step **1413**, a session for the accepted media is initiated between the ISF **130** and the first IWF **141**. In step **1411**, the first IWF **141** includes in the response message details indicating that the first media is accepted by the receiving-side user, and the second media is automatically rejected because of unsupported media by the first IWF **141**.

In step **1415**, the ISF **130** sends the response message to the CPM server **120**. In step **1417**, the first media session is initiated between the CPM server **120** and the first IWF **141**. A point in time when the ISF **130** sends the response message to the CPM server **120** may vary according to the operation mode of the ISF **130**. In other words, the ISF **130** may wait for a certain period in time to receive a response message to a new session initiation request to be sent in step **1429**, or may send the response message to the CPM server **120** as soon as receiving the first response message from the first IWF **141**. FIGS. **14**A and **14**B assume the latter. In the case of the former, when the response messages to the new session initiation request are received during a fixed period in time, the ISF **130** integrates these response messages, and then sends the final response message to the CPM server **120**, as in the operation of FIGS. **11**A and **11**B. If the response messages to the new session initiation request are received beyond the fixed period in time, then the ISF **130**, first of all, sends the response message received first to the CPM server **120** to initiate a session for the accepted media, and then modifies or maintains the initiated session according to the contents of the subsequent response messages to the new session initiation request.

In step **1419**, the CPM server **120** sends the response message to the CPM client **110**. In step **1421**, the first media session is initiated between the CPM client **110** and the CPM server **120**.

In step **1423**, the ISF **130** checks if retrying the session initiation request for the second media, automatically rejected by the first IWF **141**, is allowed. If allowed, then the ISF **130** generates a new session initiation request for the second media in step **1425**, and selects an IWF, which is most suitable to process the new session initiation request, in step **1427**. It is assume here that the ISF **130** selects the second IWF **142** supporting the second media. In step **1429**, the ISF **130** sends the new session initiation request to the second IWF **142**.

In step **1423**, the second IWF **142** sends "200 OK" as an acceptance response message to the ISF **130**. In step **1433**, the second media session is initiated between the ISF **130** and the second IWF **142**.

In step **1435**, the ISF **130** sends a session modification request to the CPM server **120**. The session modification request in step **1435** is a request for adding the second media to the first media session initiated between the CPM server **120** and the IWF **130**.

In step **1437**, the CPM server **120** sends a session modification request to the CPM client **110**. The session modification request in step **1437** is a request for adding the second media to the first media session initiated between the CPM client **110** and the CPM server **120**.

In step **1439**, the CPM client **110** sends "200 OK" as a response message to the session modification request to the CPM server **120**. In step **1441**, the session between the CPM client **110** and the CPM server **120** is modified in such a manner as to include the first and second media. Also, in step **1443**, the CPM server **120** sends "200 OK" to the ISF **130**. Then, in step **1445**, the session between the CPM server **120** and the ISF **130** is modified in such a manner as to include the first and second media.

The operation of FIGS. **11**A and **11**B, in which the ISF processes the session initiation request according to the fifth embodiment of the present invention, is the same as the operation of the CPM server, as described in FIG. **5**. However, in the B2BUA mode, the operation of FIG. **5** is performed by the ISF, and thus steps **513** and **509** in FIG. **5** must be revised as follows. That is, step **509** must be revised to "generate a response message to the session initiation request, and send it back to the CPM server", and step **513** must be revised to "select an IWF, which is most suitable to process the session initiation request message generated in step **511**, and send the session initiation request message to the selected IWF".

FIGS. **12**A and **12**B illustrate an operation of modifying an already initiated session by changing a specific media type when an ISF operates in the B2BUA mode according to a sixth embodiment of the present invention. That is, the situation envisioned in FIGS. **12**A and **12**B supposes that new media, that is, the third and fourth media, are added to the session including the first and second media, which has been already initiated in FIGS. **11**A and **11**B, and simultaneously the second media is deleted from the session.

In step **1201**, the CPM client **110** sends a session modification request message for adding the third and fourth media to the already initiated session and deleting the second media from the session to the CPM server **120**. The session modification request message in step **1201** includes SDP parameters for the first, third, and fourth media. In step **1203**, the CPM server **120** delivers the received session modification request message to the ISF **130**.

In step **1205**, the ISF **130** selects the second media session as a target session for the session modification request. In step **1207**, the ISF **130** generates a session modification request message adapted to the second media session, and sends the session modification request message to the second IWF **142**. The session modification request message in step **1207** includes SDP parameters for the third and fourth media. In step **1209**, the second IWF **142** sends back a rejection response message because the second IWF **142** does not support the third and fourth media.

In step **1211**, the ISF **130** resend a request for deleting the second media from the second media session to the second IWF **142**. Since the second media session does not currently include media other than the second media, the ISF **130** sends a session termination request message (BYE) for the second media session to the second IWF **142**.

In step **1213**, the second IWF **142** sends back an acceptance response message to the session termination request. In step **1215**, the second session between the ISF **130** and the second IWF **142** is terminated.

In step **1217**, the ISF **130** generates a media addition request message for adding the rejected third and fourth media to the first media session for which the media addition request is not yet made, and then in step **1219**, sends the generated media addition request message to the first IWF **141**. The media addition request message includes SDP parameters for first, third, and fourth media.

Since the first and fourth media are supported by the first IWF **141**, but the third media is unsupported by the first IWF **141**, the first IWF **141** accepts the first and fourth media while rejecting the third media. Thus, in step **1221**, the first IWF **141** sends back a response message including such details. That is, the response message includes information indicating that the third media is rejected due to the attribute of the first IWF **141**. In step **1223**, since the first and fourth media are accepted, the first media session is modified in such a manner as to include the first and fourth media.

In step **1225**, the ISF **130** again generates a session initiation request message for the rejected third media. For interworking of the generated session initiation request message, the ISF **130** selects the third IWF **143** in step **1227**, and delivers the session initiation request message generated in step **1225** to the third IWF **143**. In step **1231**, the third IWF **143** generates and sends back an acceptance response message to the session initiation request. In step **1233**, the third media session is initiated between the ISF **130** and the third IWF **143**.

In step **1235**, the ISF **130** generates an acceptance response message to the session modification request received in step **1203**, and sends the acceptance response message back to the CPM server **120**. The response message in step **1235** includes details indicating that all the CPM server **120** requested is accepted. Subsequently, in step **1237**, the session between the CPM server **120** and the ISF **130** is modified in such a manner as to include the first, third, and fourth media.

In step **1239**, the CPM server **120** generates an acceptance response message to the session modification request received in step **1201**, and sends the acceptance response message back to the CPM client **110**. The response message in step **1239** includes details indicating that all the CPM client **110** requested is accepted. In step **1241**, the session between the CPM client **110** and the CPM server **120** is modified in such a manner as to include the first, third, and fourth media.

In the operation of FIGS. **12**A and **12**B, steps **1207** to **1217** may be revised according to the implementation of the ISF **130**. In other words, the ISF **130** may send a media deletion request (Re-INVITE) for the second media or a session termination request (BYE) for the second media session, and simultaneously send a session initiation request (INVITE) for the third and fourth media to an IWF supporting the corresponding media. This is possible because the ISF **130** has already known which media types are supported by each IWF.

The operation in which the ISF processes the session modification request according to the sixth embodiment of the present invention is the same as the operation of the CPM server, as described in FIGS. **10**A and **10**B. However, step **1031** is revised as follows. In the case of proxy mode in FIGS. **10**A and **10**B, the CPM server proceeds to step **1033** or **1035** according to whether interworking is needed, and sends the session initiation request message to the ISF or the address of the receiving client. However, since whether interworking is needed is determined by the CPM server in the B2BUA mode, step **1031** in the B2BUA mode must be revised to "select an IWF, which is most suitable to perform the session initiation request message generated in step **1029**, and send the session initiation request message to the selected IWF". Also, unnecessary steps **1033** and **1035** are omitted, and subsequently the ISF returns to step **501** in order to process a response message to the session initiation request message.

As described above, the present invention provides a concrete procedure of not only initiating a session between a sending CPM client and a receiving non-CPM client, but also modifying an already initiated session according to media types or service environments.

In particular, when interworking is needed, a CPM server simultaneously performs interworking of multiple non-CPM services to which a receiving client subscribes, so that a CPM client can exchange various media types by one session, and a non-CPM client can exchange media with the CPM client by using various message services at the same time. Accordingly, users of message services can increase their satisfaction.

While the invention has been shown and described with reference to a certain exemplary embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A session control method in a Converged IP Messaging (CPM) server for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the session control method comprising:

after the CPM session is initiated between the first and second clients through the CPM server and an Inter-Working Function (IWF), receiving a session modification request message including a plurality of media from the first client;

sending the session modification request message including the plurality of media to the IWF through the initiated CPM session;

receiving an acceptance response message from the IWF, when a first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF;

modifying the CPM session to service the first portion of the plurality of media; and

sending a session request message including type information of the second portion of the plurality of media to another IWF.

2. A session control method in an InterWorking Function (IWF) for supporting a Converged IP Messaging (CPM) ses-

sion between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the session control method comprising:

after the CPM session is initiated between the first and second clients through a CPM server and the IWF, receiving a session modification request message including a plurality of media from the first client through the CPM server; and

sending an acceptance response message to the CPM server, and modifying the CPM session to service a first portion of the plurality of media, wherein the first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF.

3. An InterWorking Function (IWF) apparatus for supporting a Converged IP Messaging (CPM) session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the interworking apparatus comprising:

a transceiver configured to:

receive a session modification request message including a plurality of media from the first client through a CPM server and an Interworking Selection Function (ISF) after the CPM session is initiated between the first and second clients through a CPM server and the IWF,

send an acceptance response message to the CPM server, wherein a first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF, and

send a session request message including type information of the second portion of the plurality of media to another IWF; and

a controller configured to control modifying the CPM session to service the first portion of the plurality of media.

4. A Converged IP Messaging (CPM) server apparatus for supporting a CPM session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the CPM server apparatus comprising:

a transceiver configured to:

receive a session initiation message including a plurality of media from the first client,

send the session initiation message including the plurality of media to an InterWorking Function (IWF) through an Interworking Selection Function (ISF), wherein a first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF, and

receive an acceptance response message from the IWF; and

a controller configured to control modifying the CPM session to service the first portion of the plurality of media and to send a session request message including type information of the second portion of the plurality of media to another IWF.

5. A session control method in an InterWorking Function (IWF) for supporting a Converged IP Messaging (CPM) session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the session control method comprising:

receiving a session initiation message including a plurality of media from the first client through a CPM server;

sending an acceptance response message to the CPM server, wherein a first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF;

initiating the CPM session to service the first portion of the plurality of media; and

sending a session request message including type information of the second portion of the plurality of media to another IWF.

6. An InterWorking Function (IWF) apparatus for supporting a Converged IP Messaging (CPM) session between a first client subscribing to a CPM service and a second client not subscribing to the CPM service, the interworking apparatus comprising:

a transceiver configured to:

receive a session initiation request message including a plurality of media from the first client through a CPM server and an Interworking Selection Function (ISF),

send an acceptance response message to the CPM server, wherein a first portion of the plurality of media is supported by the IWF apparatus and a second portion of the plurality of media is unsupported by the IWF apparatus; and

a controller configured to initiate the CPM session to service the first portion of the plurality of media,

wherein the CPM server sends a session request message including type information of the second portion of the plurality of media to another IWF.

7. A session control method in a client subscribing to a Converged IP Messaging (CPM) service, the session control method comprising:

after the CPM session is initiated between first and second clients through a CPM server and an InterWorking Function (IWF), sending a session modification request message including a plurality of media to the CPM server through the initiated CPM session;

receiving an acceptance response message from the CPM server; and

sending a first portion of the plurality of media through the initiated CPM session and a second portion of the plurality of media through a new session with another IWF,

wherein the first portion of the plurality of media is supported by the IWF and the second portion of the plurality of media is unsupported by the IWF, and

wherein the initiated CPM session is modified to service the first portion of the plurality of media, the new session is established by the another IWF for supporting the second portion of the plurality of media.

8. The session control method as claimed in claim **7**, wherein the initiated CPM session is modified to add the first portion of the plurality of media through the IWF or remove existing media which is not requested by the session modification.

9. The session control method as claimed in claim **7**, wherein the acceptance response message is received after the new session is established from the CPM server to the another IWF supporting the second portion of the plurality of media.

10. A session control method in a client subscribing to a Converged IP Messaging (CPM) service, the session control method comprising the steps of:

sending a session initiation message including a plurality of media to a CPM server;

receiving an acceptance response message from the CPM server after a CPM session is initiated between the CPM server and at least one InterWorking Function (IWF) supporting a first portion of the plurality of media;

sending the first portion of the plurality of media through the initiated CPM session, and

sending a second portion of the plurality of media through a new session,

wherein the initiated CPM session is modified to service the first portion of the plurality of media, and the new session is established by another IWF for supporting the second portion of the plurality of media.

11. An apparatus including a client subscribing to a Converged IP Messaging (CPM) service, the apparatus comprising:

a transceiver configured to:

send a session modification request message including a plurality of media to the CPM server through the initiated CPM session after the CPM session is initiated between first and second clients through a CPM server and an Inter Working Function (IWF),

receive an acceptance response message from the CPM server, wherein a first portion of the plurality of media is supported by the IWF and a second portion of the plurality of media is unsupported by the IWF, and

send the first portion of the plurality of media through the initiated CPM session and the second portion of the plurality of media through a new session with another IWF; and

a controller configured to modify the initiated CPM session in order to service the first portion of the plurality of media, and establish the new session supporting the second portion of the plurality of media.

12. An apparatus including a client subscribing to a Converged IP Messaging (CPM) service, the apparatus comprising:

a transceiver configured to:

send a session initiation message including a plurality of media to a CPM server,

receive an acceptance response message from the CPM server after a CPM session is initiated between the CPM server and at least one Inter Working Function (IWF) supporting a first portion of the plurality of media,

send the first portion of the plurality of media through the initiated CPM session, and

send a second portion of the plurality of media through a new session; and

a controller configured to manage that the initiated CPM session is modified to service the first portion of the plurality of media, and the new session is established by another IWF for supporting the second portion of the plurality of media.

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